MARCH '60

MODERN TEXTILES MAGAZINE

Specializing in Man-Made Fibers and Blends since 1925

FIBERS

FABRICS

FINISHES

Harmony Grove's L.G. HARDMAN keeps his mill modern to keep it profitable—
story page 23

THIS MONTH

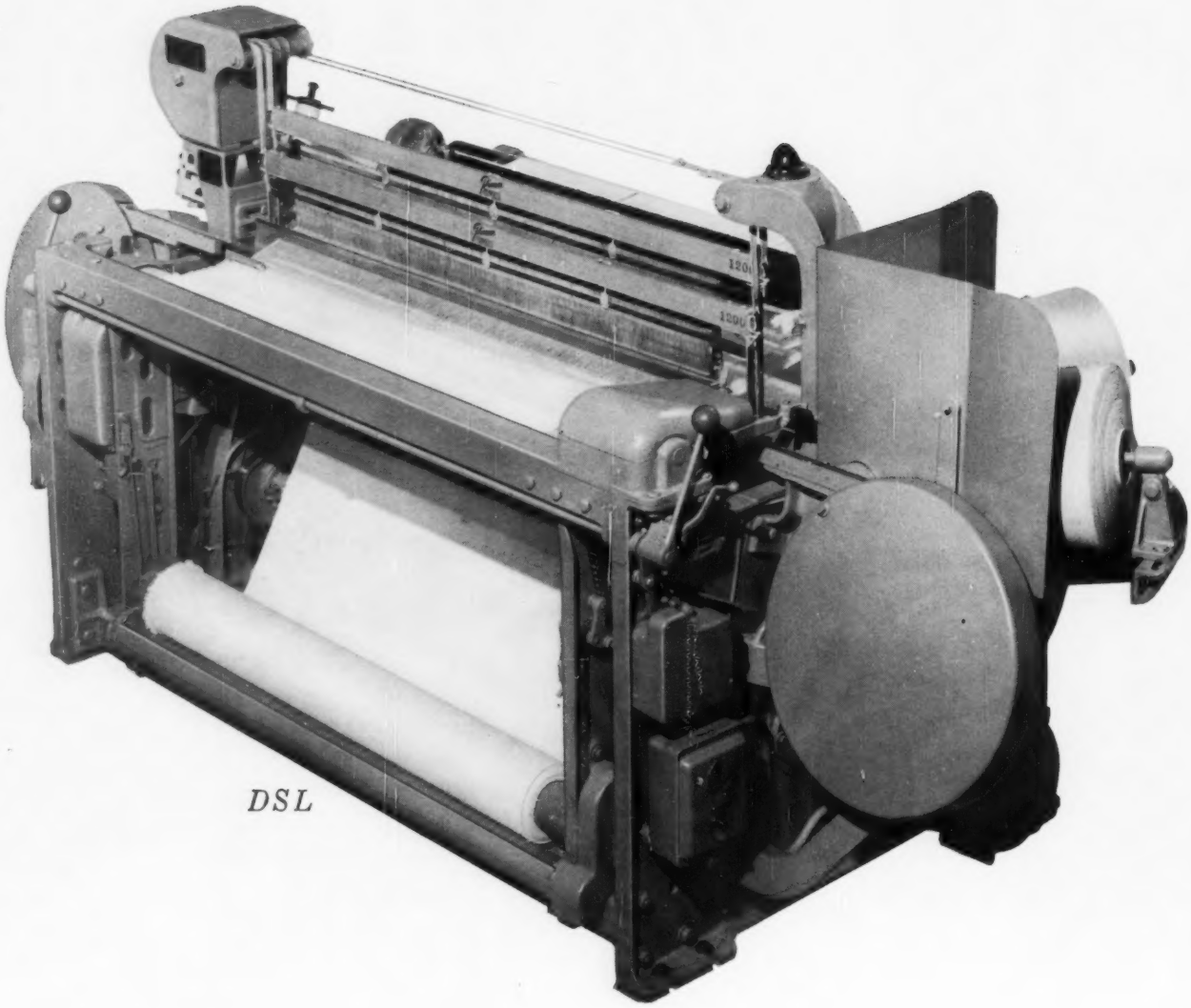
New materials for tire cord

Coloring polyester fiber

Spinning changeovers for better yarns

How fabric structure affects wash & wear

AND 11 MORE EXCLUSIVE REPORTS AND TIMELY ARTICLES



DSL

Newest
member
in our
family
of
Looms

DRAPER CORPORATION D

HOPEDALE, MASS. • ATLANTA, GA. • GREENSBORO, N. C. • SPARTANBURG, S. C.

Lacquer-tipped cone inspection at Sonoco.

Lacquer-tipped cones—another Sonoco "first"

The first lacquer-tipped cone was developed by Sonoco more than 25 years ago. It provided a new and improved method for yarn identification and gave the industry a smooth, hard nose surface for better yarn processing.

Perfecting the Sonoco lacquer tip required ingenious research and skilful experimentation. Special machinery has been designed and built for its economical production—continuous research maintains its quality.

Sonoco lacquer-tipped cones are typical of the dependable products manufactured by a fully integrated company with 60 years' experience in creating and producing all types of textile paper carriers. Only Sonoco, in its field, provides the necessary knowledge, skill and capacity to meet the ever-changing techniques of the textile industry. Let Sonoco experience help you!

SONOCO

Products for Textiles

SONOCO PRODUCTS COMPANY

ATMA
American Textile Machinery Exhibition - International
Booth Nos. 82 and 83
May 23-27, 1960

Main Office—Hartsville, S. C. • Mystic, Conn. • Akron, Ind. • Lowell, Mass. • Phillipsburg, N. J. • Longview, Texas • Philadelphia, Pa. • La Puente, Cal. • Fremont, Cal. • Atlanta, Ga. • Granby, Quebec • Brantford, Ontario • Mexico, D. F.

MODERN
TEXTILES MAGAZINE

March, 1960 Vol. 41, No. 3

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Established 1925

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303 Fifth Ave., New York 16, N. Y.
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The Principal Trade Groups

American Association of Textile Chemists and Colorists ..... Lowell Techn. Inst., Lowell, Mass.
American Association for Textile Technology, Inc. ..... 100 W. 55th St., New York
American Cotton Manufacturers Institute, Inc. ..... 1501 Johnston Bldg., Charlotte, N. C.
American Cotton Manufacturers Institute, Inc. Man-Made Fibers and Silk Division ..... 10 East 40th St., New York
Man-Made Fiber Producers Association ..... 350 Fifth Ave., New York
Silk and Rayon Printers and Dyers Ass'n of America, Inc. ..... 1450 Broadway, New York
Synthetic Organic Chemical Manufacturers Association ..... 41 E. 42nd St., New York
Textile Distributors Institute, Inc. ..... 469 Seventh Ave., New York

CONTENTS

MORE THAN 3½ MILLION SPINDLES NOW EQUIPPED WITH ROBERTS HIGH DRAFT

ROBERTS SPINNING NEWS

PUBLISHED BY ROBERTS COMPANY SANFORD, NORTH CAROLINA

WM-2 SANFORD, NORTH CAROLINA, U. S. A. 1959

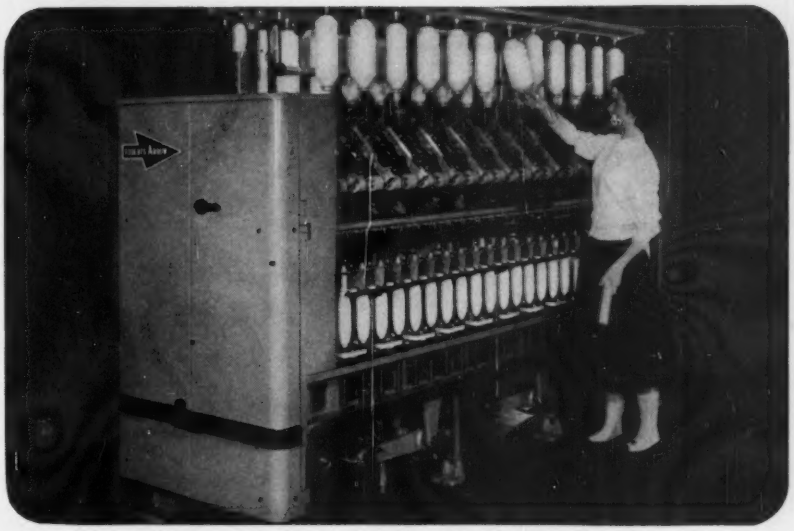
ARROW WM-2 LONG FIBER SPINNING FRAMES OFFER WIDEST YARN MAKING VERSATILITY

A dynamic program of new product design, advanced styling and aggressive merchandising is underway by all segments of the Textile Industry.

Knitting yarns of higher quality and greater interest are being called for in worsted, synthetics and blends. Finer weaving yarns up to 2 ply 80's are being called for and a great many blends are currently being explored. The longer fibers are in wide demand and the next few years should see a substantial boom in this field.

The demand for high bulk knitting yarns and the finer weaving yarns plus all of the newer fabric effects being created require fiber lengths from 3 to 8 inches long.

ARROW WM-2 frames are suitable for making yarns in any fiber length from 1½ to 8 inches. They provide great versatility in handling 100% synthetics, blends of synthetics, 100% worsteds and blends of worsted with synthetics in this range. Better quality yarns with greater evenness, bigger package sizes and higher production speeds are produced on ARROW frames.



- Spins yarn from any natural or synthetic fiber or any blend.
- PermaSet Drafting handles any fiber length from 1½ to 8 inches
- No roll setting changes needed at any time
- Great versatility for changing yarn numbers, twist, draft, ring size, and spindle speed
- Drafts as high as 24 on worsted, 60 on synthetic
- Produces yarn with better evenness and greater breaking strength
- Ball bearing top and bottom rolls eliminate all lubrication in drafting zone
- Almost ideal spinning conditions from delivery roll to spindle
- Runs at higher front roll, traveler and spindle speeds
- Reduces ends down by more than 50%
- Puts twice as much yarn on the bobbin as older frames
- 12-inch bobbins reduce winding costs
- Very rugged, most durable machine ever built for yarn spinning
- Frame is built in the wide-stance 36-inch width
- Uses ball bearings at every moving, turning or oscillating motion
- Substantially lowers electric power consumption
- AeroCreel for single or double roving
- Frame arranged for practical application of overhead cleaning and vacuum floor sweeping

Roberts ShortFlo System for Making Long Fiber Yarns

Roberts Company offers complete technical service in adapting its ShortFlo System for the production of long fiber yarns. This includes the complete yarn manufacturing process starting with tow converters, blending machines, pin drafting, roving frames, spinning frames, winders and twisters.

Where mills have existing equipment, full consideration is given to utilizing it whenever possible. Or, if a new long-fiber program is planned, all machinery can be specified, and the complete yarn organization set up.

The ShortFlo System for making long fiber yarns requires a minimum number of processes. Many doublings are provided to insure exceptionally good blending of fibers, improved evenness and better strength.

Dixon Buys Machine Shop

Dixon Corp., Bristol, R. I., designers and manufacturers of drafting changeovers for spinning frames, has purchased the complete machine shop facilities of the Southern Spindle & Flyer Co., Charlotte, N. C. Dixon took over plant operations on January 4. Southern retains its company name and will continue the moving, overhauling and trucking of textile machinery under its present management. Vito Pierannunzi, formerly plant manager of all Dixon operations in Bristol, has been named vice president in charge of the new Charlotte shop.

Akron Spool Expands

Akron Spool & Manufacturing Co. has purchased all assets except the land and buildings of L. C. Smith Bobbin Works, Phillipsburg, N. J. Engineering already has been completed at Akron's existing High Point, N. C., plant, which will more than double the manufacturing space currently available.

New Nopco Division

Metasap Chemical Co., for 42 years a subsidiary of Nopco Chemical Co., became a Nopco division on January 1, 1960. Tom Campbell, manager of Metasap, will continue as manager of the new division.

Yarn Plant Expanded

Collins & Aikman Corp, is completing installation of new spinning machinery at Norwood, N. C., representing an expenditure of $2,000,000. The plant will be able to handle long staple fiber—mohair, fine and coarse wools—and will substantially increase its production of quarter blood yarns. The modified Bradford system being installed at Norwood includes Warner Swasey and Saco Lowell worsted equipment.

Acrilan Carpet Week

Chemstrand Corp. will sponsor Acrilan Carpet Week this spring. The week will be kicked off March 12 when news about Chemstrand's promotion will be heard on the company's national network television series, "The Man and The Challenge."

New Starch Plant

Penick & Ford, Ltd., Inc., has placed its new starch and starch derivative producing plant on stream at its corn refining facility in Cedar Rapids, Iowa. The new plant will permit the company to increase its total food and industrial starch output by 40%. It is part of Penick & Ford's expansion program which includes a new laboratory.

Cotton Ginning Research

Continental Ginning Co., a manufacturer of ginning systems, has announced a more intensive effort on research, quality control and cost reduction in cotton ginning. To help Continental's research program, Charles Merkel has been named vice president in charge of engineering. A. L. Vandergriff, Continental president, in discussing the need for research, noted the heavy research expenditures by manufacturers of competitive fibers.

New Scouring Plant

The Fred Whitaker Co. has announced plans to construct a 75,000 square foot wool scouring plant in Allendale County, S. C., at a cost of $1,000,000. The plant, which will employ 75, will be a Whitaker subsidiary.

Cotton Fashion Show

A pageant of cotton fashions spanning the past 5,000 years will be staged in 50 metropolitan areas throughout the country during the next two years, the National Cotton Council announced. The tour started February 1 in Phoenix. The show includes 15 authentically re-created cotton garments from the major fashion eras from 3,000 B.C. to 1947, the year of Dior's New Look, followed by the newest 1960 fashions in cotton.

OPERATING PRINCIPLES of Static Pressure Dryers

OPERATING PRINCIPLE OF STATIC PRESSURE DRYERS

Without static pressure a yarn dryer must operate at atmospheric pressure (approx. 15 PSIA) or *one atmosphere*.

A 150 HP blower operating at full H.P. load has an inlet capacity of 4000 CFM. When operating at *one atmosphere* and 280°F such a blower will handle 250 lbs. per minute, by weight, of saturated air containing a maximum of 8000 B.T.U.

A static pressure dryer requires an average of 100 HP when operated at 5 *atmospheres* (75 PSIA) and has an inlet capacity of 4000 CFM. If operated at 280°F, the blower will handle 5 times the weight of saturated air or 1,250 lbs. per minute containing a total of 40,000 B.T.U.

Drying is the process of evaporating moisture by heat. The static pressure dryer is more efficient since it provides 5 times the B.T.U. with 33 1/3 per cent less power consumption.

Fast dryers without static pressure are available. An interview with one of our experienced sales engineers will help you decide which type of drying is best for your needs.

Gaston County Dyeing Machine Co.

WORLD'S LARGEST PRODUCER OF PRESSURE DYEING & DRYING MACHINERY

STANLEY, N. C., U.S.A.

Gaston Co. Dyeing Machine Co.	Albert P. March	J. R. Angel	A. R. Breen	The Rudel Machinery Co., Ltd.
Terminal Bldg., 68 Hudson Street	Blauertown, Pa.	1104 Mortgage Guarantee Bldg.	80 E. Jackson Blvd.	614 St. James Street, W., Montreal
Hoboken, N. J., G. Lindner, Mgr.	Philadelphia ADams 3 2901	Atlanta 3, Ga.	Chicago, Ill.	260 Fleet St., E., Toronto

Agawam Acquires Thies

Thies Dyeing Mills, West Warwick, R. I., acquired by Agawam Dye Works, Inc., Lawrence, Mass., on October 3, will continue to be operated as a separate corporation. Agawam does commission package dyeing, tow dyeing, and top dyeing and sells colored yarns. Thies Dyeing Mills does commission package dyeing and bleaching, skein dyeing, glazing, and sells colored yarns. Walter Sturrock, with Thies for the past 20 years, will be general manager.

Textile Service Firm

Three internationally known corporations with engineering and manufacturing facilities in the U. S. and Europe, have formed a new firm, Fiber Process Associates (FIPROA), a new world-wide textile service organization. The new firm, a joint venture of The Kuljian Corp. and Proctor & Schwartz, Inc., both of Philadelphia, Pa., and Sociedad Nacional Industries Aplicaciones Celulosa Espanola, of Madrid, Spain, will market the Kuljian continuous rayon spinning and processing machines.

Whitin FT Machines Sold

Whitin Machine Works has announced that four U. S. throwing mills have installed the Whitin-ARCT false twist machine, introduced at the 1959 Knitting Arts Exhibition. The four firms operating the equipment are Madison Throwing Co., Judson Mills, Burlington Throwing Co., and Luray Textile Division of Schwarzenbach Huber. Exclusive sales rights of the machine in the U. S., Canada and Mexico are held by Whitin. The machine is made in France by Ateliers Roannais de Construction Textiles. *For further information write the editors.*

Heads Leesona Unit

J. Alan Nasmith has been appointed to the board of Leesona-Holt Ltd., European subsidiary of Leesona Corp. In his new capacity as joint managing director in charge of sales, Nasmith will make his headquarters in England. He came to the U. S. in 1955 to head up export sales for Leesona (then Universal Winding Co). Richard P. Newell will succeed Nasmith as director of export sales.

Du Pont Nylon Cut

The price of 15 denier nylon monofilament hosiery yarn sold on bobbins has been reduced by $1.36 a pound effective with January shipment, Du Pont announced. The new price of $3.89 a pound matches the price set by competitors last November for 15 denier nylon yarn on bobbins sold principally to the tricot trade. All other Du Pont nylon prices remain unchanged, including 15 denier nylon monofilament sold on tricot beams at $4 a pound.

The "M" Type Herr Conical Ring introduces a new, controlled method of lubrication. This outstanding improvement in ring lubrication is called Seam Lubrication — a method that utilizes the principle of capillary attraction. Thoroughly tested for several years in some of the largest textile plants, the "M" type Herr Ring provides more uniform lubrication than has been possible before. There is no oil waste. Every drop of oil is utilized being drawn by capillary attraction through the top and conical seams. There are no wicks that leak oil — no rewicking. The operation is clean. Maintenance costs are lowered. Oil consumption is greatly reduced, yet faster spindle speeds are possible without extra wear to ring or traveler. Write today to get all the facts that make new profits.

HERR MANUFACTURING CO., INC.

308 FRANKLIN STREET • BUFFALO 2, N. Y.

FOR SPINNING AND TWISTING WORSTED, WOOLEN, RAYON, NYLON, ORLON, FIBERGLASS AND BLENDED YARNS OF ALL TYPES

8 in a series reviewing the "reasons-why" for the consumer acceptance of Arnel

ARNEL'S "STAMPS" OF CONSUMER APPROVAL

This advertisement is the last in a series highlighting only a few of the really cogent reasons from a consumer standpoint for the success of Arnel triacetate. If you have worked with this fiber you are all too familiar with its adaptability and flexibility through all stages of fabric styling and construction. In the past months, we attempted to remind you of the particulars that the consumer has in mind when he or she buys something made with Arnel.

Not the least of these in this appliance-minded age is TUMBLE DRYING. With Arnel the consumer is assured of satisfaction on this score because:

1. Arnel is naturally very fast drying. It is a hydrophobic fiber.
2. Under the physical conditions found in a tumble dryer, fabrics made with Arnel are extremely resistant to wrinkling and mussing. Remember, under normal conditions, Arnel absorbs only 3.2% moisture.
3. None of Arnel's "ease-of-care" characteristics are at the expense of the other qualities. Fabrics made with Arnel have a desirable hand, beauty and drapeability.
4. All fabrics carrying the official Arnel symbol have been pre-tested for performance claimed—including tumble drying. (Tests are conducted free of charge by the Celanese Fibers Co.).

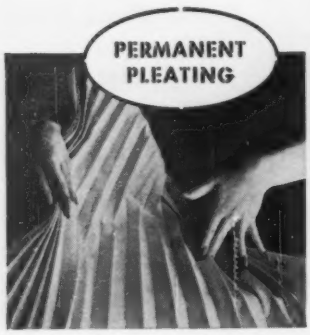
So, take advantage of the great consumer acceptance of Arnel. Let Celanese work with you to develop new Arnel fabrics. Booklets 12A, 13A and 14A, containing the important technical procedure and facts about Arnel, are available by writing Celanese Fibers Company, a division of Celanese Corporation of America, Box 1414, Charlotte, N. C.

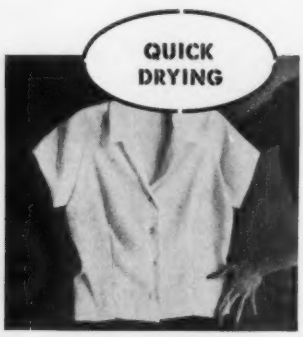
Celanese® Arnel®

District Sales Offices: 180 Madison Ave., New York 16, N. Y.; Room 10-1414 Merchandise Mart, Chicago 54, Ill.; Western Merchandise Mart, Room 478, San Francisco, Calif.; P. O. Box 1414, Charlotte 1, N. C.; 200 Boylston St., Chestnut Hill 67, Mass.; 3131 Maple Drive N. E., Atlanta 5, Ga.

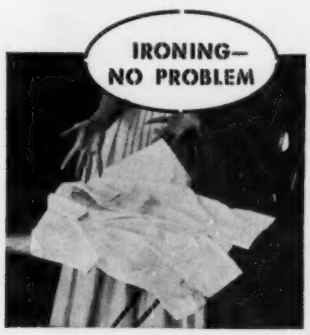
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16, N. Y.

In Canada: Chemcell Fibres Limited, 1600 Dorchester Street West, Montreal, Quebec





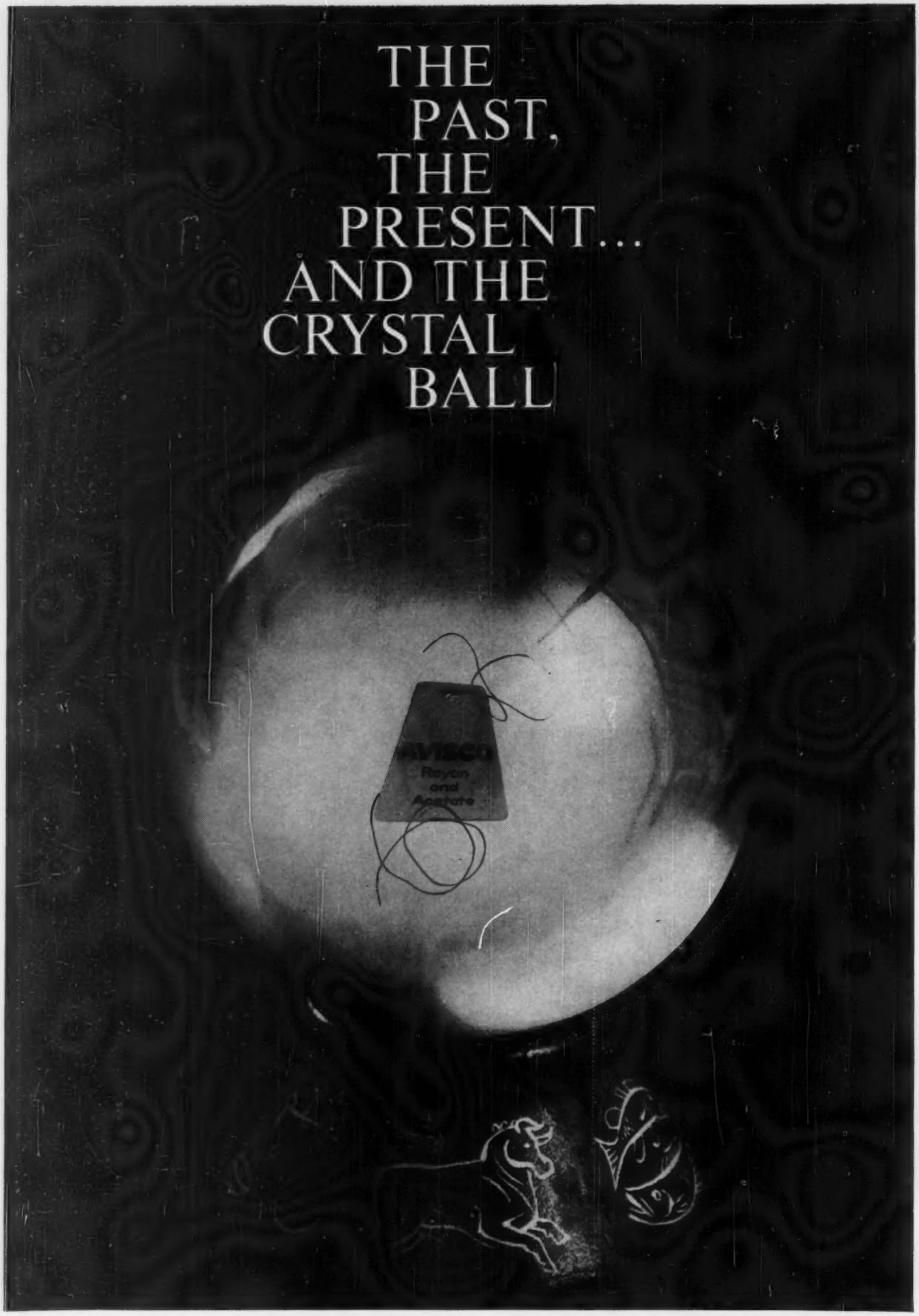
Arnel . . . a



ARNEL*

*This is the official Arnel symbol—evidence that this fabric of this new triacetate fiber has been pre-tested for performance claimed.

Celanese contemporary fiber


THE
PAST,
THE
PRESENT...
AND THE
CRYSTAL
BALL
AVISCO
Rayon
and
Acetate

Fifty years ago, American Viscose Corporation became the first commercially successful rayon producer in the United States. While the yarn was brittle and weak by today's standards, and only 362,544 pounds of it were made the first year, the venture was a success from the start. We'd like to pause for a few moments at this—the beginning of our 50th Anniversary year—to name a few highlights in our progress which may be of special concern to you. The growth of Avisco rayon has outrun all expectations. There is now 8 times as much rayon used in blends as any other man-made fiber. And of this amount, Avisco rayon's share is well over 1000 times what we produced in our first year. Much of rayon's success can be credited to extensive research pin-pointed to engineer rayon and acetate fibers to fit specific end uses. **AVISCO ACETATE** was first used in apparel . . . crepe dresses, lingerie, linings. More recently, it has found a place in the home furnishings field especially for curtains and draperies. In 1959, American Viscose developed a new acetate fiber especially for draperies. Fiber 25, as it is known, gives additional bulk, a firmer, crisper hand, an iridescent luster and makes possible unusual textures. **AVICRON®** rayon, a latent crimped rayon filament yarn, has the unusual property, when relaxed, of drawing into a tighter curl with each washing. This phenomenon opens up a whole new world of texture possibilities. Avicron is now used principally for tufted bedspreads and accent rugs. **COTRON**[1] fabrics are made of cotton and Avisco rayon. The Avisco rayon in the blend adds to the cotton a luxury of hand and drape, and a clarity and brightness of color. **AVRON*** high strength rayon was announced only a few months ago, but is already being used extensively in apparel and home furnishings. 100% Avron or Avron in blends has a luxury hand and such strength as to make possible fine-count fabrics which will accept resin finishes. Avron is a major breakthrough in fibers, has important advantages, and is highly promotable. **SUPER L*** carpet rayon, the new Avisco smooth carpet fiber, is distinguished for its long wear and soil resistance. It can be blended with wool, nylon or acrylics. **COLORSPUN*** solution dyed fibers are popular for apparel, home furnishings, automotive and industrial products. American Viscose produces a complete line of Colorspun rayon filament yarns and staple fiber and Colorspun acetate filament yarns. **THE AVISCO INTEGRITY TAG** is awarded to fabrics made with Avisco rayon and acetate fibers, which, by virtue of their construction, fiber content, and performance, meet the quality control standards of the Avisco Integrity Program. It would be interesting to know what is ahead. What we can tell you, without benefit of crystal ball, is that our Research & Development people are working on many new fibers, as yet unnamed, which will be announced during this anniversary year.

AVISCO

AVISCO®

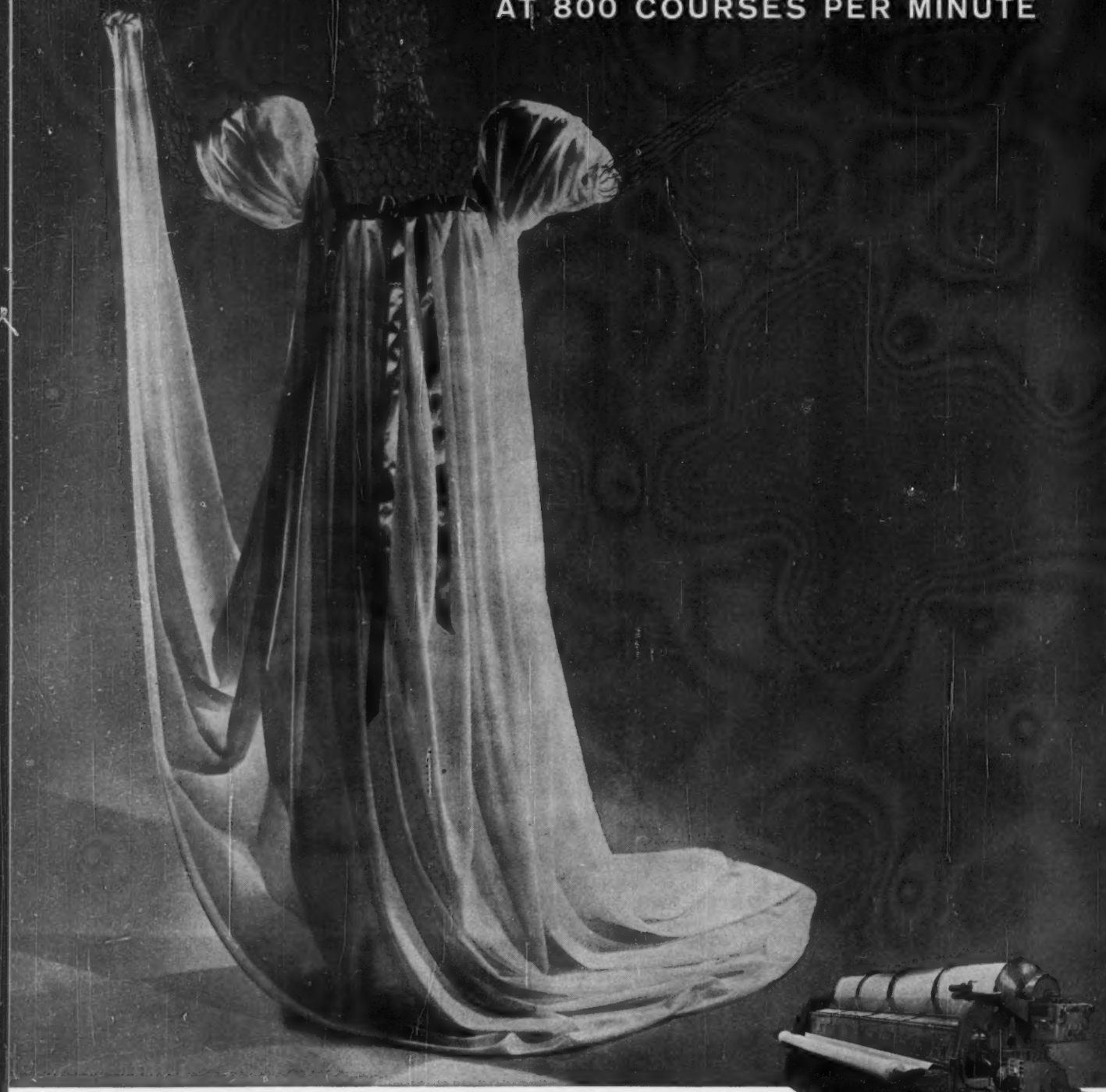
Rayon • Acetate • Cellophane

[1] TM AVC for fabrics made of cotton and Avisco rayon
*Trademark of American Viscose Corporation

AMERICAN VISCOSE CORPORATION, 350 Fifth Avenue, New York 1, New York

Beautiful Tricot Fabrics

AT 800 COURSES PER MINUTE

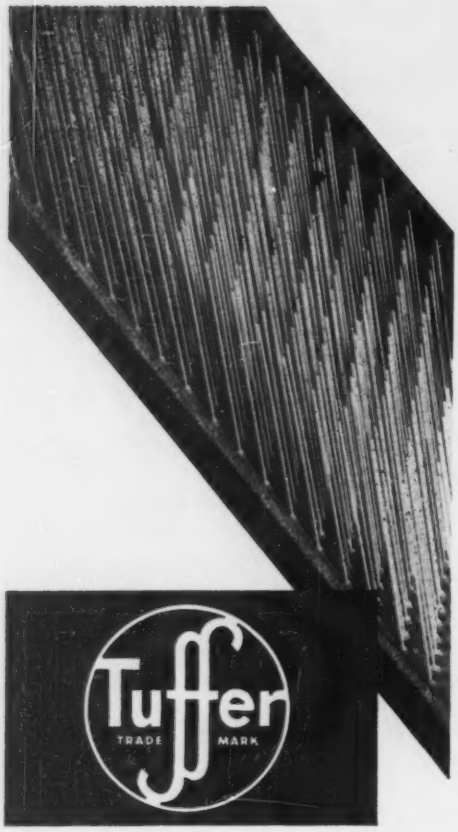


Wire Products Division

TEXTILE MACHINE WORKS • READING • PENNA.

Builders of Textile Machinery Since 1900

The "READING" *Tricot Machine*



FANCIES that insure the best carding

This Tuffer promise is based on three important factors:

1. The FOUNDATION material is carefully inspected and selected for each type of fancy by our own skilled men, in our own plant.
2. The WIRE is tough, strong and of even temper, with just the right carbon content.
3. Tuffer ENGINEERING SERVICE is always available. When a carding problem develops, a Tuffer man will work with your key men, in your own mill, to determine the best solution. Special foundations or special wires recommended by Tuffer engineers have resolved many carding problems.

The combination of these factors is your guarantee of the finest fancies you can find—anywhere.

Call or Write to our Home Office
for Immediate Attention—No Obligation

TUFFER PRODUCTS

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- Lickerins rewired at Southern Plants
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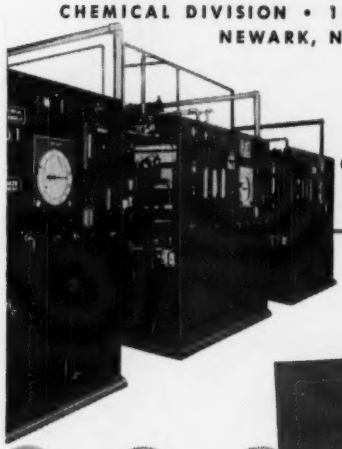
Southern Plants: Atlanta, Ga., Gastonia, N. C., Greenville, S. C.
Direct Representation in Canada

for the most efficient production of oxygen-free gas

. . . provides by far the most economical and efficient method for the production of pure nitrogen —*completely free of oxygen*—and with hydrogen content precisely controlled at any desired percentage between 0.5% and 25%. Nitrogen is supplied at a fraction of cylinder supply cost.

CHEMICAL DIVISION • 113 ASTOR STREET
NEWARK, N. J.



NITRONEAL® GAS GENERATOR

for indication of oxygen or hydrogen in other gases

The **MINOXO® INDICATOR** measures traces of molecular oxygen in other gases—from 1 to 10 parts per million, and from 1 to 100 PPM. High sensitivity and rapid speed of response enable it to be used for laboratory investigation and production quality control.

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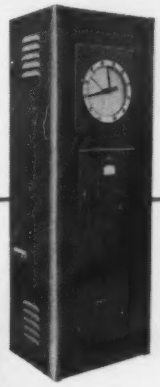

MINOXO® INDICATOR

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a complete line of platinum laboratory ware

All standard forms and sizes for chemical and physical purposes, made of platinum or any desired alloy. Line includes crucibles, reshapers, triangles, dishes, electrodes, anodes and cathodes. A catalog is available upon request.

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NEWARK, N. J.

spinnerettes for synthetic fibres

Precious metal and stainless steel spinnerettes with rigidly controlled hardness and grain characteristics are available in standard and special designs. All surfaces are mirror-like, including walls of finest holes, for maximum protection against corrosion to assure trouble-free production. Write for "Spinnerettes" brochure.

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Investigate the **super versatility** of the Leesona **Model** 10 Ring Twister. **Plies** Man-Made Fibres • Glass • Cotton • Silk • Wool • Worsted • Combination Yarns • **Delivers** from Cones • Cheeses • Cakes • Pirns • Spools • Bobbins • On to Taper-Top • Double-Taper and Straight-Wind packages.

Manufactured by **Leesona Corporation,** P. O. Box 1605, Providence 1, R. I.

LEESONA

23T.9.1

Koppers dyes are right for every fiber

Quality color in modern living is of utmost importance. To achieve consumer-pleasing shades of vibrant, long-lasting color—regardless of individual fiber characteristics—count on dependable Koppers dyes.

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MODERN TEXTILES
Magazine

Publisher's Viewpoint

Our Technical Groups Move Ahead

Awareness of the need to grow and change with the changing times is being shown by two of the textile industry's long-established and highly regarded technical societies. That these groups, the American Association of Textile Chemists and Colorists, and the American Association for Textile Technology should both be moving (in complete independence of each other, of course) toward renewed and expanded vitality is good reason for great satisfaction for everyone interested in the continuing progress of textiles.

Recently, a carefully prepared and thoughtful report on the long range objectives of the American Association of Textile Chemists and Colorists was submitted to the officers of the Association and is currently under study by them. It was the work of a committee of members headed by Ernest R. Kaswell. The fact that the committee was appointed by AATCC's president, the fact that it worked hard and well to prepare its report is wonderfully heartening evidence of the strength and health of the Association.

And this impression is overwhelmingly reinforced by the statesmanlike recommendations of the report. Space will not permit us to report them in full but it can be said that they reveal a deep awareness of the high function fulfilled by AATCC and a determination to broaden and enrich these functions in the future with the good purpose of enhancing the scientific and professional status of the Association.

The report points out, for example, that "rapid technological developments in material have resulted in many replacements for traditional textile fibers, yarns and fabrics. Paper, plastics, nonwovens, foams, leather, metals, glass and the like, are now being used in specific applications as either replacements or extensions of previously used conventional textile materials. "AATCC," the report says, "should embrace those areas of 'non-textile textiles' within its technical framework" and adapt its testing techniques and methods to the pressing needs of these new and related industries.

In the same spirit, the committee recommends that the Association "broaden its base to accommodate all those interests which are concerned with the science and technology of color."

All in all, the committee's report is sure to be of benefit to AATCC. Even if all its recommendations are not adopted, the report nevertheless points to a nobler, more elevated concept of usefulness for this worthy professional society.

Growth for AATT

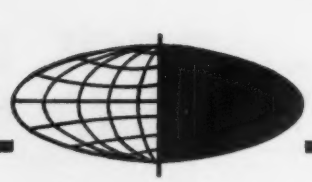
Meanwhile in another well-regarded group of textile scientists, new vitality is flowing, higher and broader aims are being brought into focus. The American Association for Textile Technology has just adopted a new constitution that will open areas of growth and greater achievement for this professional society of technologists and others in allied areas of textile activity.

Outstanding among the new constitution's provisions are those that permit AATT to become a truly national organization with chapters in all sections of the country. Two such regional chapters have already been set up. One is the Appalachian Chapter centering at Elizabethton, Tenn; the second is the Piedmont Chapter with headquarters in Charlotte, N. C. With true progressive spirit the new charter also provides for the formation of student chapters of which one already exists at New Bedford Institute of Technology in Massachusetts.

Another bold new departure provided by the new constitution is the establishment of a Technical Council to provide better technical direction for the Association. These provisions for broader activity of AATT for the first time on a national scale are indeed encouraging. It augurs well for the future of textile technology, so vital for the well being of our industry as a whole, that the American Association for Textile Technology is again on the march seeking bigger and even more useful tasks to perform on behalf of better textile products, and higher levels of technology for the industry.

A. J. McCullough

TEXTILE NEWS



World Wide

GERMAN NYLON CORD TIRES are being offered to buyers of cars for the first time as standard equipment. The German affiliate of Dunlop and Vereinigte Glanzstoff Fabriken developed the tire cord fabric. It is said to be especially heat resistant to withstand temperatures generated by high driving speeds. The tires have a 10-20% longer life than rayon tires, according to Dunlop. Continental and Phoenix Firestone are also about to furnish nylon cord tires.

DRALON, PERLON MAKER, Farbenfabriken Bayer, is planning a broad expansion of production this year. The German firm expects to double output of its acrylic fiber Dralon in the first half of 1960, with production of 16,000 tons. Perlon production is to be accelerated from 400 to 600 tons a month. Farben Bayer is spending $75 million to expand. Overall turnover should rise 10% over the 1959 figure of $614 million.

JAPAN FIRM LICENSED by Farben Bayer will make Dralon. The company is Teikoyu Rayon Co.'s new affiliate, Teijin Acryl Co., also owned by Kunoshima Chemical, Toyo Koatsu and Nihon Keori. Initial capacity of a new plant in Iwakuni City will be 6,600 pounds with 44,000 pounds expected by 1963.

JAPANESE MAN-MADE FIBER output in 1959 rose 25% to set a new record of more than one billion pounds, according to the Chemical Fibers Association. All fibers showed increases, the greatest rayon which soared 41.2% during the year.

RUSSIA, INDIA LOOK TO JAPANESE rayon manufacturers for assistance. The Russians have increased their 3.9 million pound order for rayon filament yarns, delivery during 1960, by two million. The companies: Asahi Kasei, Teikoyu Rayon, Toyu Rayon, Kurashiki Rayon, Toyo Spinning and Nihon Rayon . . . Three Japanese firms will construct a 10-ton-per-day production plant for rayon yarns in India. Companies doing the $4 million building job are: Asahi Chemical, Shin Mitsubishi (machinery) and Mitsubishi Shoji (export transactions).

RAYON PACED UK MAN-MADE production to new peak of about 514 million pounds in 1959, according to the British Man-Made Fibers Federation. Makers of floor coverings and men's wear fabrics staged greatest gains. The former record was 495 million pounds in 1957.

BRITISH FIRM GRANTS CZECH company the rights to produce polyester fiber. Imperial Chemical Industries accorded production rights to Czech National Silon Corp. but excluded both technical information and use of the name Terylene.

ICI CUTS UK PRICE for polyethylene and polyethylene products, by a bit over 3¢, to 32¢ a pound. Only the domestic market is affected by the move which was aimed at increasing home demand.

UK FEARS HONG KONG clothing imports more than those likely to come in as a result of recent lowering of UK trade barriers from the United States. The Garment Manufacturers Section of the Manchester Chamber of Commerce stated: "Just as clothing made in this country has a high sales appeal in the States so will the reverse be the case."

BRITISH HOSIERY WORKERS receive an unusual pay cut, as of March 1. The reduction, 2½%, is due to a cost-of-living sliding wage scale clause. About 35,000 workers are to be hit.

EUROPE BOOSTS MAN-MADE FIBER production nearly 12 times in 10 years, according to an Organization for European Economic Cooperation report. Output in 1950, when the industry first began to make itself felt, was only 9,000 tons. This rose to 107,000 tons in 1958. Unofficial 1959 rise was about 25% more. OEEC noted that greater production has brought lower prices, hence an improved competitive position over natural fibers. The 1958 output figures for three greatest producers were: UK—33,000 tons (21,000 nylon; 11,000 Terylene); Italy—19,000 (12,900 nylon; 4,400 Merinova); France—23,400 (nylon and Rilsan over 70%).

DENMARK TO TAKE MORE Japanese textiles. According to Copenhagen sources, Denmark this year will be able to import about 60% more in dollar value from Japan than it did in 1959, as a consequence of the relaxation of Japanese voluntary curbs on exports.

ITALIAN EXPORTS TO US of a wide range of textiles set new record high last year, according to the Rome Central Institute of Statistics. Pacing the 1959 export boom to the U. S. (Italy's second greatest customer, after Germany) were: man-made fiber fabrics, from $800,000 in 1958 to $4.3 million; knitwear and footwear exports to the U.S. totaled $80 million, against $57 million in 1958.

By Jerome Campbell
EDITOR, MODERN TEXTILES MAGAZINE

Hard working, friendly L. G. Hardman, Jr., has shown the world that a smartly run, rigorously modern textile mill need not be among the biggest to be comfortably profitable

Forward-thinking Hardman of Harmony Grove

HARMONY GROVE MILLS of Commerce, Georgia, is essentially and understandably in the business of manufacturing cloth as a profit-earning organization. Its management, however, has always regarded the mill as fulfilling the equally important function of providing jobs and good cash income for the people of the little northeastern Georgia rural community where the mill is located. It was for this purpose mainly that the mill was built back in 1893 by Hardman's grandfather, Dr. William B. J. Hardman, in association with several other businessmen of Commerce. The original mill was equipped with 10 spinning frames and 60 looms powered by a wood-fired 150 horsepower steam engine.

In those beginning days, when fabric manufacturing was almost unbelievably simple compared to the complicated present, Harmony Grove Mills turned out sheetings and shirtings which were sold as gray cloth through New York agents. The first sample of cloth made in the mill, deemed good enough for marketing, was sent to Wilkins & Giles in New York. Later its output was sold through Ribinson & Shackleton, a firm some oldtimers may still remember. Early records show that the mill's first cotton was bought at six cents a pound; burlap for wrapping the cloth cost five cents a yard.

In 1898, Dr. W. B. J. Hardman's son, Dr. Lamartine Griffin Hardman, also a practicing physician, became president of Harmony Grove, a position he held until his death in 1937. Serving as president of the mill was only one of his activities; he practiced medicine with great distinction, being at once a practical country doctor and one of the most skilled and sought-after surgeons in Georgia; he entered politics and was elected governor of the state for two terms (1927—1931.)

His son and namesake, L. G. Hardman, Jr., now president of Harmony Grove, spent his boyhood in Commerce close to the mill and the mill's workers. After he graduated from the University of Georgia in nearby Athens in 1930, he worked for a few years supervising the Hardman family farms and orchards. It was in his heart, however, to make a career in textiles. To acquaint himself with the mill's operations, he made it a practice to work in the mill two hours or so every night after putting in a full day at his other duties. For this work as a mill trainee he received no pay, but did learn by doing the basic operations in making cotton yarn and cloth.

In 1932 he went to work full time in the mill as assistant to the president with duties encompassing its general operation and management. Within a few years the directors were so impressed with his devotion to his job and his increasing skill as a manager

(Continued on Page 50)

NEW MATERIALS

for tire cord

To supplement and perhaps replace rayon and nylon, new fibers for tire cord are coming down the pike. Here is a survey of the most promising among them with some facts on their good points and weaknesses

By C. A. Litzler,
PRESIDENT, C. A. LITZLER CO., INC.

IN THE CONTINUING SEARCH for improved tire carcass reinforcing materials, fiber producers are developing new cord materials or are improving performance characteristics of older fibers. The net effect is a considerable increase in tire cord and cord fabric dependability which is resulting in greater tire mileage, increased tire safety and generally higher tire performance.

In the past twenty years, there have been eleven varying types of fiber introduced for tire use. Eight of these have been introduced in the last ten years. This rate of increase shows the degree of effort being exerted by textile companies to improve the basic fiber available to the rubber industry. A review of the past accomplishments of the fiber industry shows a rapid forward stride in the tenacity of textile fibers produced for tire use. In eighteen years, there has been an overall tenacity increase from 3.6 grams per denier to 7.5 grams per denier. (Figure 1).

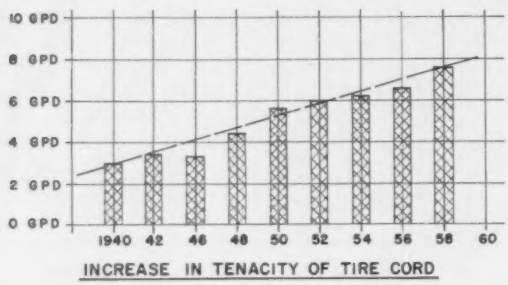


Figure 1

The growth pattern of tire cord through the years up to 1958 shows a steady gain in non-cellulosic cord fabrics and a partial reduction in conventional rayon fabrics. (Figure 2). In the past year, viscose cord developments have increased the tenacity of that material and, generally, considerably advanced that material's other important characteristics. Accordingly, the usage of that material has considerably increased in the last year and somewhat influenced the fiber usage trend in the industry. This applied principally to the U. S. A., as a different pattern exists in Europe. The use pattern of rayon and nylon fibers for tire use is shown only to set the proper perspective in relation to other likely fibers which are to be described and outlined in some considerable detail in relation to the characteristics of these fibers for tire use. Rayon and nylon cords will be excluded from this paper except as mentioned above.

The scope of this paper embraces the other fiber materials which are now being used, productively or experimentally for tire cord uses. Some fibers and

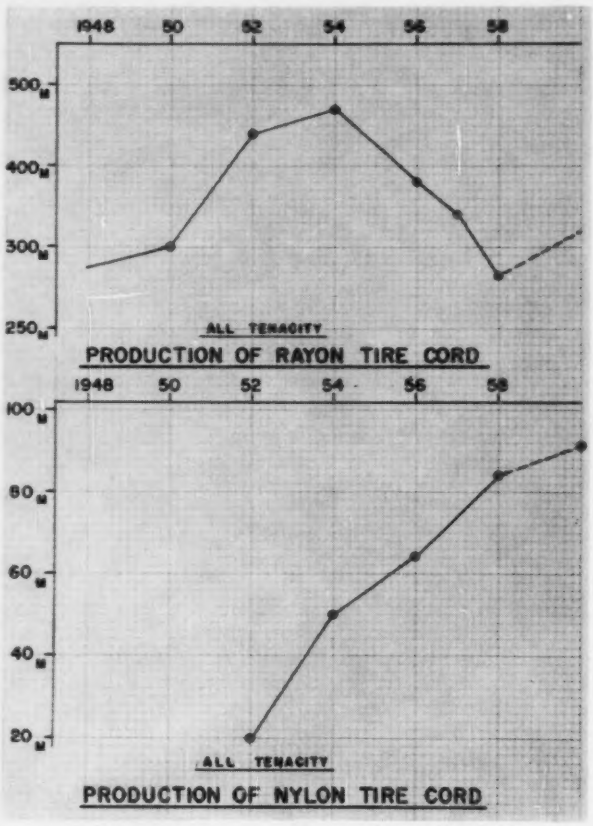


Figure 2

(Continued on Page 36)

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George Carmel
in a wool check dyed with
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National® Alizarine Cyanone Green 4G

Another versatile, new dye from National Aniline . . .
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5 How to Use the Tables

By Thomas F. O'Connor

THE FOLLOWING is the step by step procedure:-

1. Having obtained t as shown in Article 4*, proceed to find t_1, t_2, t_3, t_a similarly.
2. Set the value 60 for T.
3. Calculate the cycle ratio, p, from the formula

$$p = \frac{t + t_2}{T + t_a + i_a - t_2}$$

4. Having p, it is only necessary to know the value of N in order to use the Tables to obtain the value of the productivity factor, A.

5. In the special case when the only work done on the machine is non-deferrable work done by the principal (and only) operator while the machine is stopped, A represents the operator's rate of production in mrh (machine running hours) per hour,
A/N represents the machine efficiency (or the fraction of an mrh produced per machine per hour), and
p.A represents the operator's workload as a fraction of an hour per hour.
An example of the special case was given in Article 2**, where also the terms were defined.

6. In the general case, a correction factor, F, is needed where

$$F = 1 + \frac{t_a + i_a + \frac{A}{N} t_3 - t_2}{T}$$

Then D will represent the operator's hourly production in mrh, and

$$D = A/F$$

E will represent machine efficiency
and

$$E = A/NF \text{ or } D/N$$

Cycle time

$$H = NTF/A \text{ or } NT/D$$

Operator workload

$$B = \frac{A}{FT}[t + t_1 + t_2 + t_3] \text{ or } \frac{D}{T}(t + t_1 + t_2 + t_3)$$

(Since B cannot have a value greater than 1.0, then it follows that the value of A cannot exceed

$$A_{max} = \frac{FT}{[t + t_1 + t_2 + t_3]}$$

In practice, since time studies by general agreement are about 5% inaccurate, B (and therefore A_{max}) would be taken at about 95% of the above value.

Interference

$$i = H - [T + t + t_3 + t_a + i_a]$$

The word average or standard should precede each of the above terms. It has been omitted to avoid tedious repetition. It is important to remember that the "operator" in these articles is an industrial engineering abstraction. He can work at only one pace—the standard pace—and can produce only one efficiency for a given set of conditions—the standard efficiency. When it is stated or implied in the text that a certain efficiency is the maximum, it is to be read in this sense. Real machine tenders of course operate at different rates and produce different efficiencies. What we are establishing are the standards with which these performances are to be compared.

EXAMPLE

Data

$t = 10$; $t_1 = 0$; $t_2 = 8$; $t_3 = 1$; $t_a + i_a = 4$. All in minutes per mrh.

$N = 5$ machines to one operator.

Also the accompanying section of the Tables. (Table III)

Required

(a) to find the standard efficiency and operator workload for these conditions, and

(b) to find and analyze the cycle time.

Solution (a)

1. Cycle ratio, $p, = \frac{10 + 8}{60 + 4 - 8} = \frac{18}{56} = 0.3215.$

2. For $N = 5$ and $p = 0.3215$, $A = 2.736$ (from the Tables by linear interpolation between $p = 0.320$ and 0.330.)

3. $A/N = 2.736/5 = 0.5472$.

4. Factor $F = 1 + \frac{4 + 0.5472 - 8}{60} = 0.9425$

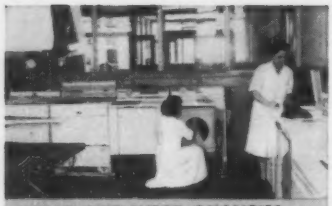
5. Output $D = A/F = 2.736/0.9425 = 2.900$ mrh per hour.

6. $E = D/N = 2.900/5 = 0.58$ or 58%.
This is the required standard efficiency.

7. $B = \frac{D}{T}(t + t_1 + t_2 + t_3) = \frac{2.900 \times 19}{60} = 0.92$
This is the required standard workload.

(Continued on Page 30)

* Feb. '60, p. 27
** Aug. '59, p. 65



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Vycron is the most advanced polyester fiber ever to achieve commercial production in America. And that position of leadership will be safeguarded by the most stringent quality control and policing program ever put behind any polyester fiber, with the United States Testing Company, Inc., acting as official scientific laboratory.

First of all, the fiber will be under a tight check-control from the moment the raw material enters our plant until the fiber itself is ready for shipment. But that, of course, is normal procedure for any well regulated manufacturing operation.

Vycron quality control goes much further! As a matter of fact, we can accurately say that we never relinquish control of Vycron quality until it reaches the consumer's hands in a finished product!

Before any mill can label its grey goods or finished fabrics with the Vycron name, the fabrics must first be tested and certified by the Testing Company against specifications. The Vycron polyester fiber content, for example, must meet our standards for the particular fabric construction in question. And all performance claims must be fully substantiated by scientific test. The same regulations apply to converters for finished goods.

But even that isn't enough for Vycron!

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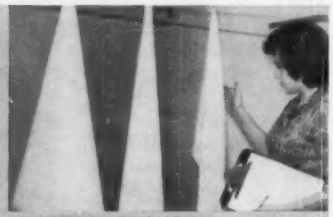

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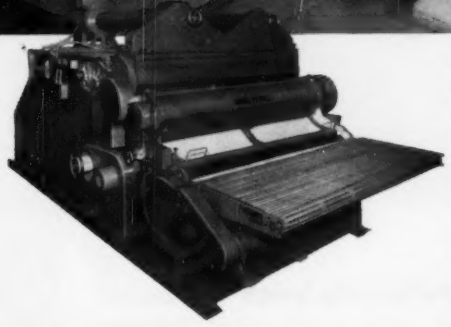

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TEXTILE DIVISION
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Multi-Machine Assignments

(Continued from Page 27)

Solution (b)

1. Cycle time, H, $= N.T/D = \frac{5 \times 60}{2.900} = 103.5$ mins. per mrh.
2. Interference, i, $= H - (T + t + t_s + t_a + i_a)$
   $103.5 - (60 + 10 + 1 + 4) = 28.5$ mins. per mrh.

The analysis reveals that each machine is non-productive 42% of the time. This non-productive time splits into three roughly equal parts—during one part work is being done on the machine by someone; during the other two thirds the machine is idle and unattended.

Note the high operator utilization as compared with the low machine utilization (or efficiency) — 92% as against 58%.

Table III. Values of the Productivity Factor, A

N.	Values of p. .155	.160	.165	.170	.180	.190	.200
1	.866	.862	.858	.855	.847	.840	.833
2	1.701	1.692	1.683	1.674	1.656	1.639	1.622
3	2.497	2.481	2.464	2.448	2.416	2.384	2.352
4	3.244	3.218	3.191	3.165	3.112	3.060	3.008
5	3.930	3.891	3.851	3.811	3.732	3.653	3.576
6	4.543	4.486	4.429	4.373	4.261	4.150	4.041
7	5.069	4.992	4.915	4.839	4.688	4.541	4.397
3	5.501	5.401	5.302	5.204	5.012	4.827	4.650
9	5.835	5.711	5.589	5.470	5.239	5.020	4.813
10	6.077	5.930	5.788	5.649	5.385	5.138	4.908
11	6.239	6.074	5.914	5.760			
12	6.339						
∞	6.452	6.250	6.061	5.882	5.556	5.263	5.000

N.	.210	.220	.230	.240	.250	.260	.270
1	.826	.820	.813	.806	.800	.794	.787
2	1.605	1.588	1.571	1.555	1.538	1.522	1.507
3	2.320	2.289	2.258	2.227	2.197	2.167	2.138
4	2.957	2.906	2.853	2.806	2.757	2.709	2.662
5	3.499	3.423	3.349	3.275	3.204	3.134	3.065
6	3.934	3.829	3.727	3.628	3.531	3.438	3.347
7	4.258	4.124	3.994	3.869	3.749	3.634	3.524
8	4.480	4.318	4.164	4.017	3.878	3.747	3.622
9	4.617	4.433	4.261				
∞	4.762	4.545	4.348	4.167	4.000	3.846	3.704

N.	.280	.290	.300	.310	.320	.330	.340
1	.781	.775	.769	.763	.758	.752	.746
2	1.491	1.476	1.461	1.446	1.431	1.417	1.402
3	2.109	2.080	2.052	2.025	1.997	1.970	1.944
4	2.615	2.570	2.525	2.481	2.438	2.396	2.354
5	2.998	2.933	2.869	2.807	2.747	2.689	2.632
6	3.260	3.175	3.094	3.016	2.940	2.867	2.797
7	3.419	3.319	3.223	3.132	3.045	2.961	2.882
8	3.505	3.393	3.288				
∞	3.571	3.448	3.333	3.226	3.125	3.030	2.941

3. The analysis is shown below:-

Analysis of Cycle Time

	mins. per mrh	%
The machine is running	60	58.00
While the machine is stopped:—		
main operator on non-deferrable work (t)	10	9.65
main operator on deferrable work (t_s)	1	0.97
auxiliary help at work or on the way ($t_a + i_a$)	4	3.88
waiting for the principal operator (i)	28.50	27.50
Totals	103.50	100.00

The 8 minutes of t_s does not appear in the analysis since it occurs during the 60 minutes the machine is running.

Roberts Spindle Sales

In the 10 years just ended, Roberts Company has had an increasing impact on the textile industry, according to Robert E. Pomeranz, president. Over 3½ million spindles were replaced, modernized or newly-installed with Roberts high draft spinning, just about 20% of the operating spindles in this country.

Since mid-1956, when Roberts began making complete new machines, the company has received contracts for 1,351 complete spinning frames totaling 387,028 spindles. Added to this were contracts received since the beginning of 1950, totaling 3,165,728 spindles of modernization changeovers. The company's sales in 1959 were up 60% from 1958, and 1960 is expected to show another sales jump of 50% over last year, Pomeranz said.

BLEACHING
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How to color polyester fiber

Here are some practical suggestions for getting better results when dyeing polyesters including blends

by F. F. Jacobs
PUTNAM CHEMICAL CORP.

POLYESTER FIBERS are now well known, not only in the trade, but also in consumer circles, where they have received wide acceptance. Most widely used are fabrics of either 100% polyester; blends of 65/35 or 70/30 with cotton, and blends with wool.

Chemically, the fiber is based on terephthalic acid and ethylene glycol.

Considering the increasing number of trade names for synthetic fibers, it may be advisable to mention the presently used names for polyester fibers. These include, of course, DuPont's Dacron, Eastman's Kodel and Beaunit Mill's Vycron. Other trade names from newer manufacturers, no doubt, will be added in the future.

Depending on the source of manufacture, some physical properties show variations. Dacron has a sticking temperature of about 460°F and a melting temperature at about 480°F Kodel, however, melts at between 554-563°F.

The polyester fibers are resistant to most solvents and also to acids and alkalis under normal conditions. All accumulate static electricity and show essentially similar dyeability. They are manufactured in different deniers.

Polyester fibers can be dyed under normal dyeing temperatures at the boil. They can also be dyed at temperatures above the boil, 255°F, requiring pressure dyeing equipment. Finally, colors can be fixed on the cloth by heat setting. The latter method permits the dyeing of blends containing cotton to a union shade or with a cross dyeing effect, employing selected vat colors.

Precleaning Necessary

To obtain best possible results in dyeing polyester fiber in regard to levelness and fastness while retaining an undamaged fiber, it is essential to subject the material to a precleaning operation. This generally consists of treating the cloth with a suitable detergent such as Kieralon B, and an alkali, such as soda ash. The material is treated for 30 minutes at about 175°F. After such treatment, the polyester fiber should receive an acetic acid rinse to become free of alkali. This is a necessary precaution to prevent damage to the fiber, particularly if the subsequent dyeing operation is carried out at temperatures exceeding the boiling point. The acetic acid rinse is also useful, as it assures a slightly acid condition of the dyebath, an advantage in dyeing disperse dyes. For coloring polyester fiber, three groups of dyestuffs may be employed: Disperse dyestuffs; Vat dyestuffs; Pigments.

Disperse dyestuffs are most widely used, as the polyester fiber has good affinity for these ester soluble types. The natural affinity, however, is considerably reduced in the production of the yarn, as it is subjected to a high degree of stretching. This is a necessary evil and is done to obtain a desired mechanical strength. The stretching or drawing reduces intermicellar spaces, increasing at the same time in proportion the highly oriented regions. Such regions do not readily accept the dyestuff and, being almost completely crystalline, reduce also the moisture uptake of the fiber.

In order to increase the rate of fixation or diffusion, two methods can be employed:

(1) the use of "carriers"; (2) dyeing at higher than boiling temperature.

Importance of Carriers

Carriers are usually polar compounds, such as substituted phenols, amines, or carboxylic acids. Their function is to loosen the highly crystalline structure of the polyester fiber. Carriers are not necessarily solvents or swelling agents for the polyester fiber. Phenol, for instance, is a solvent for polyester; however, it has practically no effect in increasing the dyeability, while benzoic acid deepens the dyeshade but has no dissolving or swelling action on polyester.

Suitable carriers may possess a certain affinity for the fiber. This causes their diffusion into the polyester and the enlargement of the inner surface of the macromolecular fibrils, expanding at the same time the crystalline structure. Thus, an increased rate of dyestuff uptake is accomplished.

Most carriers have to be used carefully. Being insoluble in water, dispersions have to be carefully prepared, to avoid specks in dyeing. They may be carried away with the steam and drip as condensates back on the cloth, again causing specks. Toxicity has to be taken into consideration; and finally the finished cloth may develop an unpleasant odor in storage due to a residual presence of an insoluble carrier.

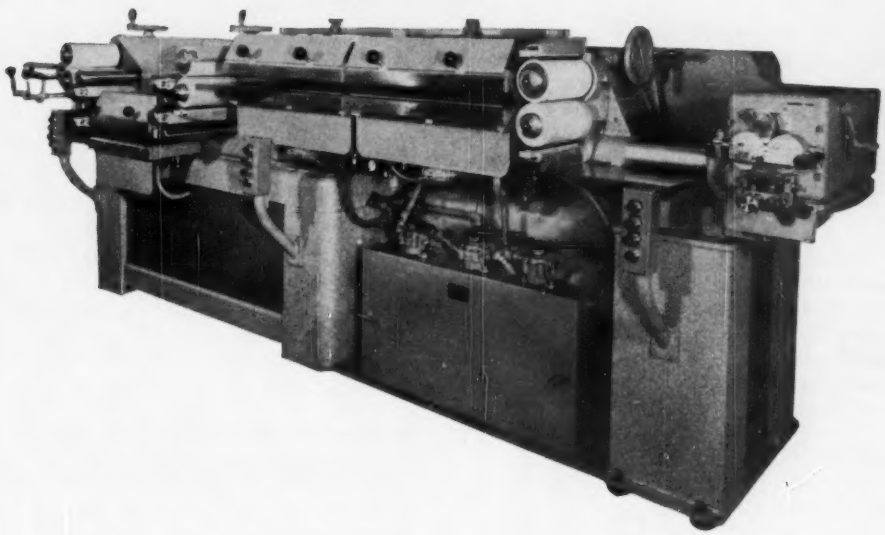
The newest development in the carrier chemistry is the Palatinit TX 5064. This product is hot water soluble. Due to its high boiling point, it is not carried into the steam, remaining in the dye bath at all times. It can be completely removed from the fiber after the dyeing cycle, precluding odor formation in storage or a detrimental effect on light fastness.

It should be mentioned at this point that residual amounts of phenolic carriers left in the goods are subject to rapid degradation on exposure to light. The degradation causes a change as well as a fading of the dyed shade. Materials free from carriers possess a predetermined light fastness.

(Continued on Page 34)

3 machines in 1

New Turbo TP Machine draws, stabilizes, and crimps thermoplastic fibers in one continuous operation . . .



Until now, it required three separate operations to convert tow bands of undrawn fibers into salable tow — draw frames, conditioning machines, and crimpers.

With the new Turbo TP Machine, fiber producers can deliver tow with higher tenacity, lower elongation. Fibers processed on the TP Machine have superior fiber characteristics for cut staple or tow.

In fiber plant operation, it has been found that the TP Machine has an advantage over draw-frames in dollar machinery expenditure versus pound output.

For a practical demonstration, let your thermoplastic fibers be drawn on the production unit in the Turbo laboratory — and you be the judge. Or ask to see a Turbo representative.

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Coloring Polyester Fibers

(Continued from Page 32)

The digression from description on the use of disperse dyestuffs to the action of carriers was necessary in order to illustrate the dyeing technique.

Dyestuff manufacturers are constantly adding new products to conform to requirements of given fibers. In the disperse color range many improvements have taken place—additional shades are available, better dispersion of existing products has been achieved and, finally, special groups of disperse types have been produced. Such special types, as the Palanil dyestuffs are manufactured in a form particularly suitable for dyeing polyester fiber. They produce level dyeings, brilliant shades and excellent fastness properties.

The dyeing procedure conforms to the usual method of dyeing at the boil and is as follows:

The cleaned material is first pretreated with the carrier (e.g. Palatinit TX 5064). The addition of the carrier to the dye bath is figured on the liquor ratio and not on the weight of the cloth. At a liquor ratio of 20:1, 4 lbs. carrier to 100 gallons are added, somewhat larger amounts for heavy shades are used. Temperature of the dye bath is about 160°F. The material is entered and treated for 15-20 minutes, then dissolved dyestuff is added, the temperature slowly raised to a boil and kept at the boil for about 2½ hours.

These special disperse dyestuffs can also be dyed at elevated temperatures up to 225°F and will show excellent results without the use of a carrier.

To obtain maximum results in fastness properties, particularly those to rubbing and light, it is essential to subject the dyed material to a reduction cleaning bath. It consists of treating the material in a bath of:

1½ lbs. hydrosulphite conc. powder;
1½ pts. caustic soda 40° Be and
¾ lbs. non-ionic detergent

Within 30 minutes, the bath temperature is raised to 165°F and is then maintained at this temperature for another ½ hour, after which the material is rinsed well.

Complete Penetration

With regard to fastness properties, it is important to note the fact that optimum results in regard to fastness to light are only obtainable if the dyestuff has completely penetrated the fiber. Actually, this is the case when dyeings have been produced either at high temperatures, or with carriers at normal dyeing temperature. Under such conditions, the desired swelling of the fiber has been obtained, offering no resistance to the diffusion of the dye.

Disperse dyestuffs render themselves well for shading purposes. Small additions to the dyebath can be made at the boil, larger additions, however, require a reduction in the dyeing temperature, before they are made. Carrier additions are not required for shading.

Heavy dyeings can be lightened with additional amounts of carriers and in presence of polyvinyl pyrrolidone-Albigen A.

When dyeing blends of polyester fiber and wool with Palanil—disperse dyestuffs, the following conditions are essential to obtain best possible results in regard to union shade and fastness properties.

Proper selection of disperse dyestuffs—those with least possible staining of the wool.

Cleaning of the fibers after completion of the dyeing cycle—this is best accomplished by a treatment with 2½ lbs. sodium hydrosulphite conc. powder per 100 gallons for 30 minutes at about 115°F.

Selection of the dyeing procedure, such as normal boiling temperature or high temperature dyeing. The wool part of the blend is least affected—stained—when dyeing at elevated temperatures above the boil. This is likely due to the fact that the polyester fiber is more absorbent and the dyeing time is shorter.

The handling of the material is essentially the same, whether dyed at the boil or at higher temperature. At high temperature, the dyeing commences at 160-170°F, then the temperature is raised in half an hour to within 225°F and the dye bath is kept at that temperature.

Dyeing Blends

When dyeing blends of polyester fiber with either cotton or rayon, a varying degree of staining of either fiber takes place. To obtain a good white, a reduction cleaning is accomplished in the bath containing

1½ pts. caustic soda 40° Be
1½ lbs. hydrosulphite conc. powder
and a suitable detergent

A 30 minute treatment at 150°F results in good white of the cotton or rayon blend, without affecting the polyester dyeing.

The use of pigments, either in a padding operation or in application printing, has gained considerable recognition. The simplicity of application as well as the high wash and light fastness have been deciding factors.

When using water phase pigment preparations (Lumatex types) the pad liquor contains the necessary amount of pigment and binder as water dispersions. Other additions can be made to conform to end use specifications. Softeners, as well as synthetic resins, may be added. The coloring of the fiber, as well as the finishing operation, is carried out in one operation. After padding and drying, the cloth is cured to obtain the necessary fastness. Straight polyester material or blends with other fibers produce union shades in the simplest possible manner.

In application printing with pigments, emulsions are prepared. These are printed, dried and cured. A uniform coverage of all blended fibers is obtained in this method.

An interesting method of color fixation presents the heat setting or the so-called Thermosol process.

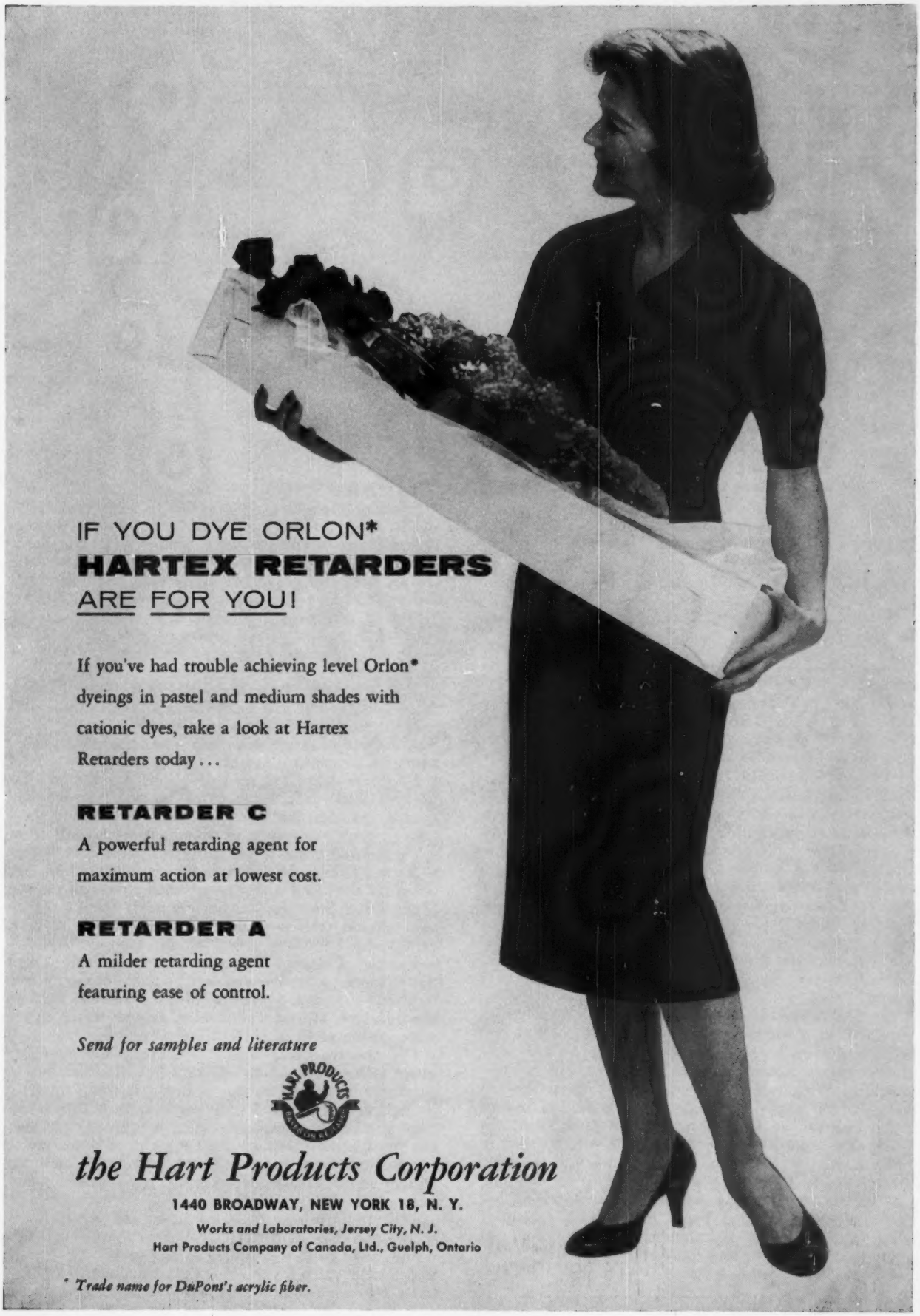
Blends of polyester with cotton are padded with disperse and vat dyestuffs in presence of Sizing Agent T8 new. The padding is dried, then heat treated at 375°F for 1½ minutes.

During the heat setting, vat colors from a selected range develop fully on the polyester fiber. To obtain their fixation on cotton, the material is treated on a jig with a blind vat. By this method, union shades as well as crossdye effects can be obtained. The resulting fastness of vat colors on polyester fiber essentially conforms to the fastness on cottons.

REFERENCES:

Fixation of disperse dyes on printed polyester fabrics. By Dr. R. Zeidler, BASF. *Textile Industry and Chemical Fiber Industry*, Vol. I, BASF Lab. Reports.

America's Textile Reporter, Jul. 16, 1959.



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* *Trade name for DuPont's acrylic fiber.*

Tire Cord Materials

(Continued from Page 24)

materials are comparatively old and several are new but all of them are now being actively developed and studied for use in the tire cord market.

The Perlon Group—Nylon 6

Perlon fiber was developed originally about twenty years ago in Germany and, for sometime, it was thought to be suitable for tire cord use. This material is a Caprolactam-based fiber and is generally known as Nylon 6. Although this material possesses excellent qualifications and is much used in other end products, it has been now determined that it is not particularly suited, in original form, for tire usage.

Many attempts to produce satisfactory performance tires showed only fair results and, after some time, it was generally conceded that it was unsatisfactory. A consensus of opinion by most rubber companies indicates that its main physical deficiencies for tires arise in two categories:

1) Its low heat stability and general low level of thermal constants.
2) Its medium tenacity as compared to today's accepted maximum.

The Polycaproamides

The fiber next to be discussed for tire cord usage in the U.S.A. is the nylon 6 material known commercially as 66 HBT Caprolan*. (Editors note: Caprolan nylon tire yarn is produced by Allied Chemical Corp., 261 Madison Avenue, New York 16, N. Y.)

Chemically, the polymer is designated as epsilon polycaproamide, developed from compounds known for over fifty years. Recent chemical innovations and developments have rendered this fiber acceptable for tire cord use. It differs from Nylon 66 in a few basic respects. The melting point is lower than that of Nylon 66, but HBT Caprolan has lower thermal retraction under load and better tensile strength-retention properties at elevated temperatures. Caprolan has considerably better physical constants and high temperature properties than other nylon 6 yarns.

In fatigue value, HBT Caprolan is rated by its producer at a relatively high level. Fatigue tests up to 3,600,000 cycles have shown longer life than other fibers under Rotorflex Test conditions. In tension vibration tests, Caprolan, running to failure, showed 10% longer life than other fibers involved in the tests. The tensile/load elongation characteristics are quite favorable when compared with other fibers in both gray cord and in dipped and multiple-zone stretched and treated conditions.

Treating of the cords for fabrics is now being accomplished on several types of existing multiple-zone fabric treaters or calender line equipment. In fact, all of the major tire companies are using Caprolan cords, at the present time.

* Allied Chemical's trademark for its nylon fiber.

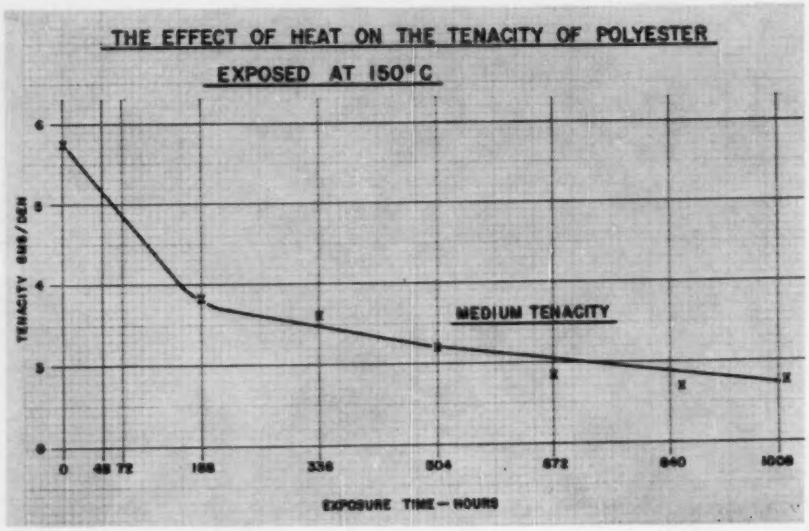

Figure 3

The Polyester Group

Another fiber which has advanced experimentally, at this time, for tire cord use is the polyester group. It is known locally as Dacron, abroad as Terylene, Diolen and Tetoron. The differently named materials are all basically polyethylene terephthalate and are the product of terephthalic acid dimethyl ester and glycol. It originated in England approximately ten years ago. (Editor's note: Dacron polyester fiber and continuous filament yarn is produced by the DuPont Co.)

The polyester filaments have a uniform round cross-section and are basically soft and subtle and have a reasonably high grams/denier strength. They have excellent strain load characteristics and excellent high temperature stability (Figure 3).

All other technical considerations considered, the basic problem encountered in the polyester rubber system has been the adhesion of the cord to the elastomer. Many experimental tires have been built from polyester and quite successfully run. However, all of these test tires have been built from fabric which has been hot stretched and treated with xylol/isocyanate adhesives. Some work has been done in Europe utilizing trisocyanates and methylethyl ketone solvent vehicles.

The use of solvent dips is not a practical solution to the polyester adhesive problem as there are very few treating machines available now for solvent dips as the industry, almost universally, is now using aqueous solution of RFL or Pyridine adhesives.

The DuPont Co. recently announced the development of an aqueous-based adhesive for its Dacron polyester fibers and rubber systems. It was primarily introduced for use in V-belt cords, hose and possibly Dacron rubber coated fabrics. High level operation has been experienced in these systems. Some experimental tires have been built but, as yet, the material Hylene is not recommended as being suitable for tire use.

Other adhesive systems are being worked on elsewhere and they hold considerable promise to produce a high level polyester rubber adhesive at high fatigue and temperature levels. It is being developed principally for tire cord fabric to rubber adhesion.

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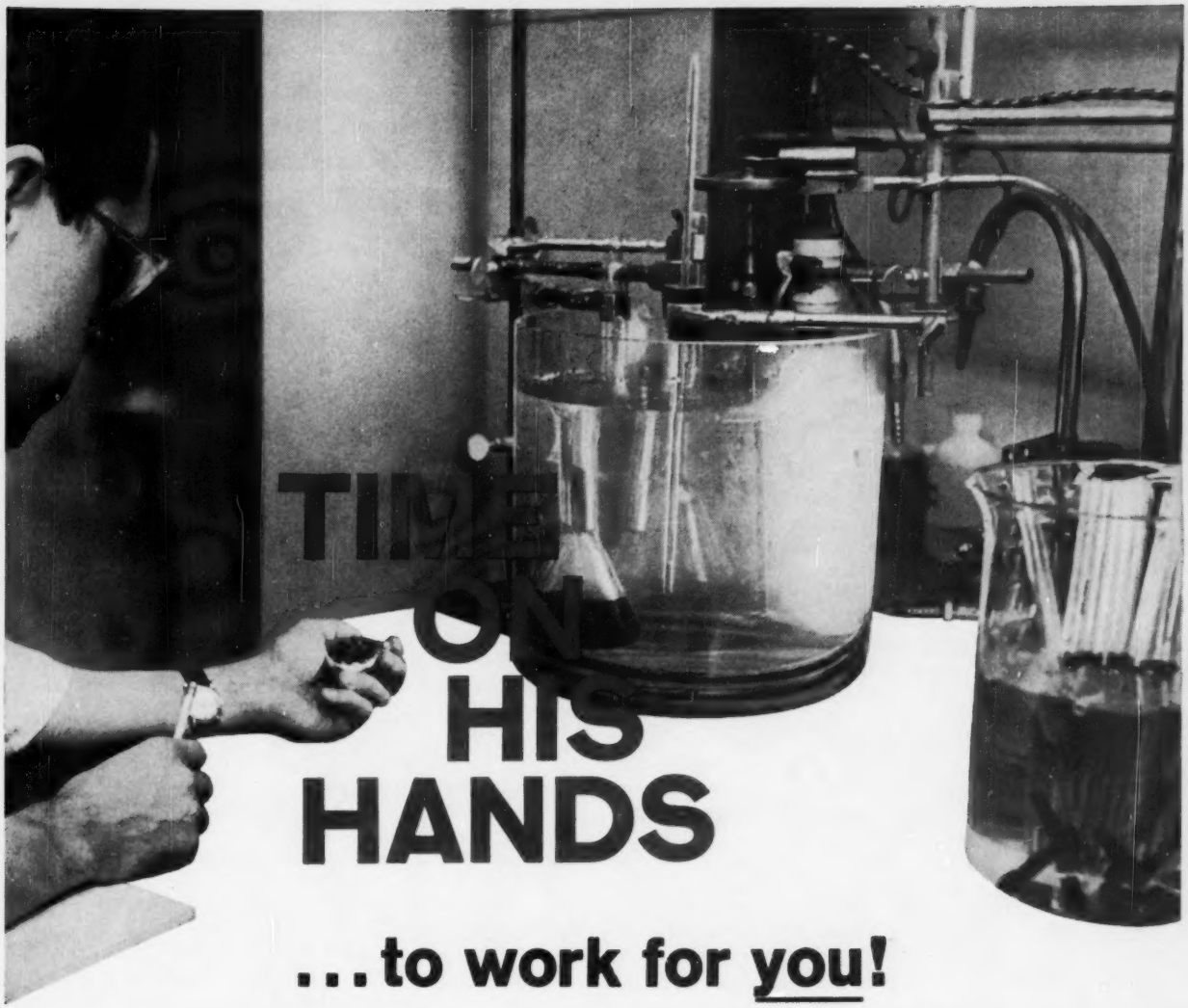

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Tire Cord Materials

(Continued from Page 36)

Laboratory and pilot plant developments and test results of the polyester group of cord fabric types as yet are not entirely conclusive by any means. The work that has been concluded in the last five years seems to hold much promise. Although the material is somewhat lower in tenacity than nylon and the new cellulosic fibers, it seems to combine the advantages of both and seems to eliminate the disadvantages of the other materials.

In comparison to other fibers, the polyester group, as such, has equivalent or superior tensile elongation characteristics to other more commonly used fibers. It can be expected that this important material will be increasingly coming into prominence in the intermediate range future. It has been reported from several sources that the use of polyesters has been fully approved and standardized upon by the U.S.S.R. Air Force for all aeronautical tire use. If this is true, it lends credence to the more increasing use of this material as has been predicted by many European tire and textile engineers and designers.

The Wire Tire

The continuously increasing success of the wire tire on the Continent has created a major increase in interest in this type of tire in the U.S.A. and elsewhere. The principal use of wire tires is in truck and bus tires and, in some cases, for off-the-road tires. Mileage life in most cases, with relatively smooth road surfaces, is very high and, in some reported cases, is phenomenal.

The importance of this type of heavy duty tire is demonstrated in the fact that the usage of high carbon tire wire in the U.S.A. is now at the 6,000,000 lb. per year level. It is fully expected to reach a rate of 12,000,000 lbs. yearly by 1972 or 1973.

Virtually all major American producers are in production on wire tires, either under foreign technical license agreement or by independent work of their own. Continuous development work on new designs, cord constructions, rubber compounds and manufacturing techniques is under way.

The wire tire, as such, differs not only in the obvious matter of cord material but also in the construction of the carcass plies and in the method of the tire's manufacture. Conventional tire designs are used in some cases but the characteristic of the material also allows, or rather necessitates, a radically different tire construction known as the "radial ply".

The strain load of the wire cord also allows considerable ingenuity in tire design, which ingenuity has produced a novel and unique European tire design. The cord wire itself usually consists of seven 3-wire strands of which six are concentrically stranded around a middle triple wire strand. Individual strands are triple strands of .0058" diameter individual wires. The cable lay is a nominal .340". All wires are usually brass plated. The tensile strength of the individual wires is in the range of 400,000 pounds per square inch. Cord diameters are about .035" diameter plus or minus .001" over the brass plating.

Another wire construction commonly used is a wire strand composed of five strands of seven .0058" wire, each seven strands being laid concentrically around a 3-wire central strand. The diameter of this cord is .048" including the brass plating.

The wire carcass performs well under off-the-road service under adverse conditions. The low elasticity of wire strand is offset by its high tensile strength. Even in dual tire application under some tire conditions, stone pickup and consequential bruise between adjacent side walls does not cause undue short carcass life.

Glass Fiber Tire Cord

Another material which appears to be becoming the subject of current research for tire use is glass fiber tire cord. As long ago as 1940, the possibility of glass fiber tire cord had been a long range goal of the producers of that material. In fact, at that time, there was considerable theoretical research carried on to determine the then best methods of cord treatment, adhesion systems and building technique to utilize this material.

In 1945, a full scale development program was undertaken by a small tire company and a glass fiber company to develop a glass fiber tire. Passenger car tires were built of glass cords using filament construction and low rate of twist which was then deemed practical. The filament was finally woven into suitable familiar type fabrics and subsequently treated.

Cord and fabric constructions were designed (at that time) in full cognizance of the high strength of glass filament and the high self-abrasion of the material. High rates of internal cord chafing were suspected and the fabric and tire design supposedly took these conditionings into full consideration.

The cord fabric was woven and pre-adhesive treated with a solution nylon adhesive for adhesion of the RFL. After the adhesive treatment, the cords were given a suitable and familiar resorcinol formaldehyde latex pre-treatment for the rubber bonding. The fabric was then rubber calendered in the usual manner.

The tire construction that was used was conventional with normal ply and bias angles and conventional rubber compounds, tread design, bead wraps and the like. Despite the high strength of the warp cords, the experimental tires did not produce anything but disappointing results, due to filament self-abrasion which was partially expected. The tires failed in less than 100 miles of use.

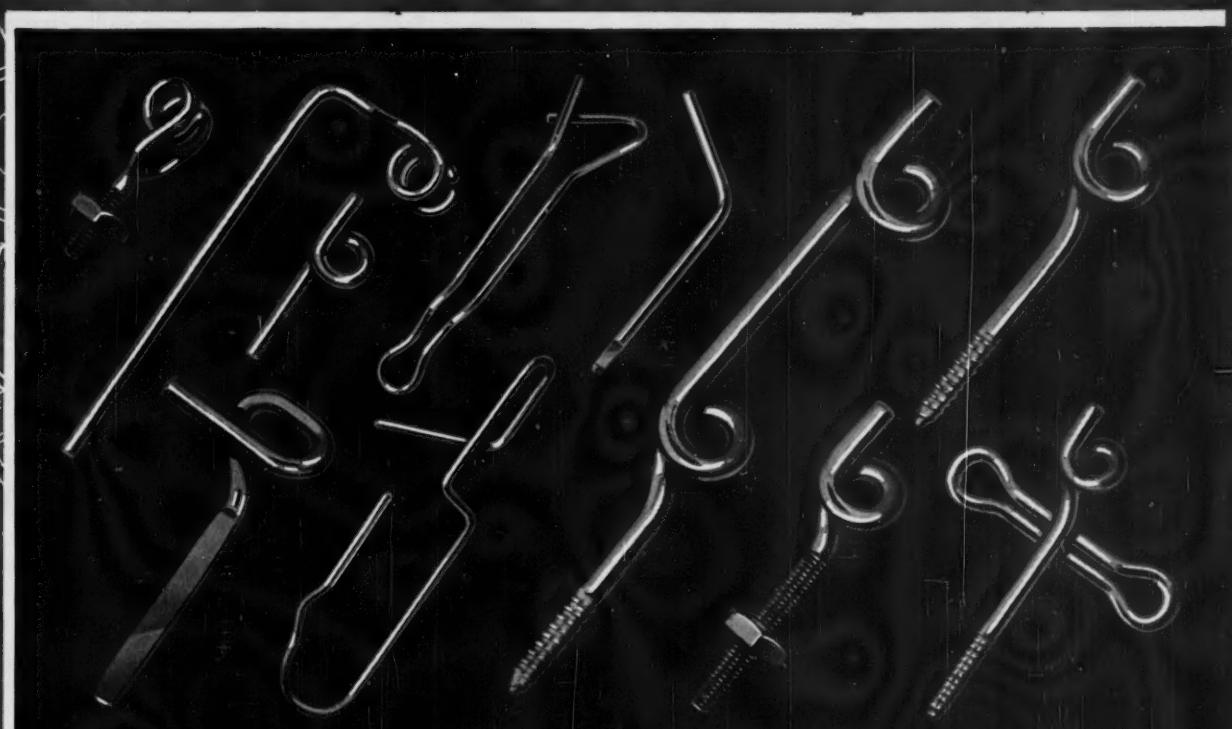
Most recent U.S.A. development work on glass tire cords has utilized glass woven cords; a different cord end count and a silastic rubber polymer treatment. These developmental tires had the expected ability to withstand temperatures greatly in excess of the conventional tire (because of its silicone rubber polymer). In fact, temperature ratings of 100 to 110% higher than any conventional rubber tire yet produced were actually obtained.

That particular tire utilized a different tire cord construction system, a different adhesive system; and, because of the utilization of silicone rubber, a relatively special building and processing technique. The end results were particularly more distinguishing than the previous earlier attempts. The combining of glass and silicone in a pneumatic tire form to withstand extremely high temperatures was a marked step forward.

Other attempts at building glass fiber tires were made and with some dubious measure of success. Different cord constructions, different building techniques and, in fact, a different approach to the total problem was evolved.

(Continued on Page 46)

MACHINERY and EQUIPMENT SECTION



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Modernized spinning frames

Whitin Super-Draft Changeovers installed at Carolina Mills yield better yarns, lower costs

By the Editors

AMONG advances in design which have been developed for the spinning frame, the modern drafting system stands out. At Carolina Mills, Plant No. 1, Maiden, N. C. 48 spinning frames were modernized by the application of a complete Whitin Super-Draft Changeover.

The mill produces approximately 80,000 lbs. per week of 12s to 24s sales yarn, singles and 2-ply. Part of the production is for weaving; the remainder goes to the knitting trade for outerwear fabrics. Yarn produced consists principally of white cotton and colored synthetics. Yarns are made from 1 1/32" cotton, straight or blended synthetics and cotton/synthetic blends. The synthetics are 1 9/16" staple or solution dyed viscose, Dacron polyester fiber, Orlon acrylic fiber or acetate. A particular mill specialty is a mock twist yarn made from 1 9/16" black Coloray and 1 1/32" cotton. The mill sells direct to its customers.

The executive staff is headed by J. W. Abernathy, President, T. P. Pruitt, Jr., Vice President, Leonard Moretz, Secretary, Treasurer and General Manager, E. P. Schrum is Assistant General Manager. J. W. Inscoe is supervisor of Sales Yarn Production and Earl C. Killian, Superintendent of the No. 1 Plant in Maiden.

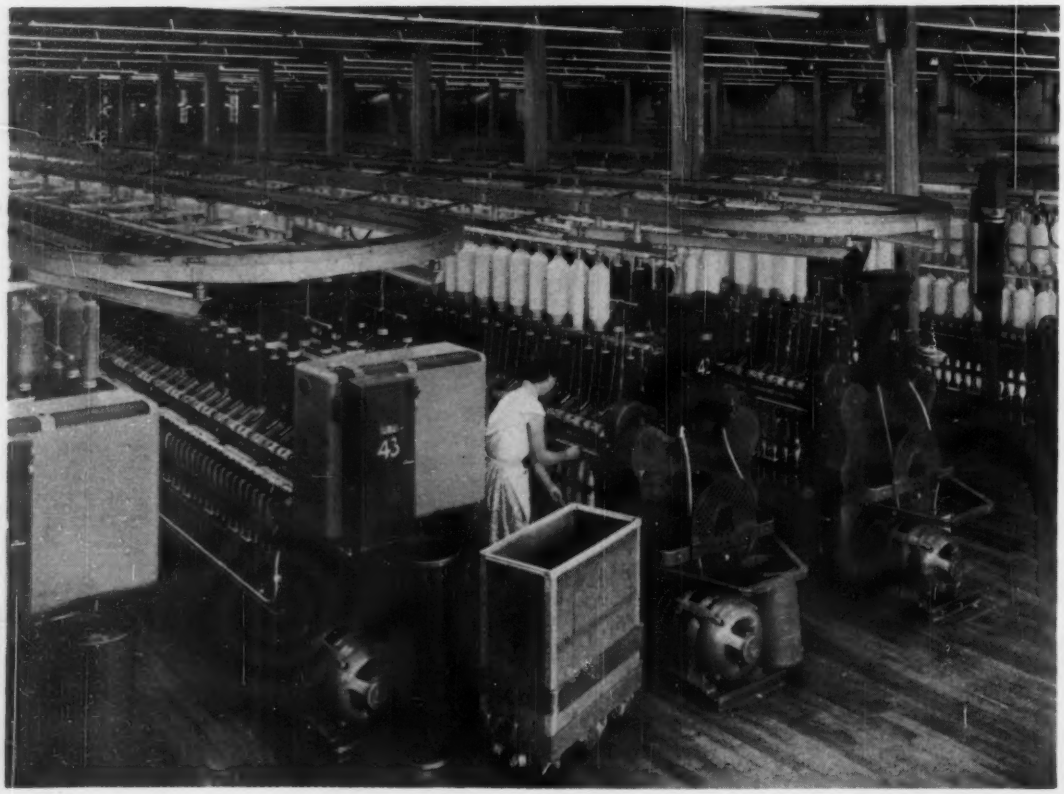
In changing over its 12,192 spindles on 48 frames, the mill had several objectives. First, the mill management wished to take advantage of larger package 14" x 7" roving, coarser roving—.80 hank roving instead of 1.25 hank roving formerly run—greater operating flexibility, reduced ends down and reduced production costs.

An outstanding requirement was machinery flexibility. Frequently the various lots running through the mill at one time are as high as 25, with 8 to 10 different mixes and up to four counts from each mix. The ability of the spinning frames to handle this broad production range of fibers and blends is important. Because it is a producer of quality sales yarns, the plant's management expects evenness and excellent break strength in the yarns produced, and especially in yarns spun for the exacting requirements of the knitting trade.

Changeover Elements

Equipment modernized included 24 older model Whitin frames and 24 Fales & Jenks frames. Except for a few 3¾" gauge, the frames are 3½" gauge.

The modernization by Whitin of the drafting system on these 48 frames included:



READY FOR THE FUTURE — Some of the 48 spinning frames at Carolina Mills No. 1 plant, Maiden, N. C., modernized for faster production, improved yarn quality.

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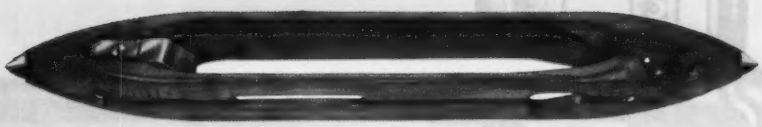

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The Durapic plastic Picker has a remarkably long life, and gives unequalled service with fewer replacements.

Southern Picker Sticks have long been famous for their stamina and strength, with a variety of selection to meet every requirement.

Why not let one of our Sales Engineers show how you can profit more with Southern Products.

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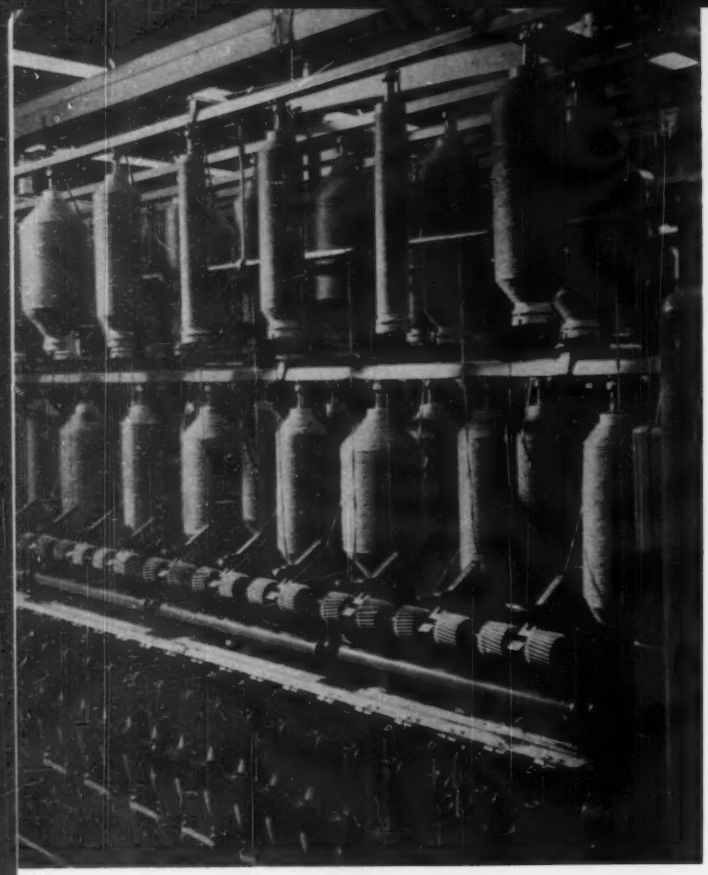


CLOSE-UP—Details of Whitin Unitrol and Super-Draft changeovers on spinning frames.

Adjustable roll stands. These are 30° stands, with grease fitting for bottom front roll lubrication.

New 1" front bottom rolls, screw necked and casehardened.

New 1" knurled middle roll. The former front bottom roll was used for the present back line.

Complete new draft gearing to provide for constant of 1011.5 (This allows a maximum draft range approximately 14 to 34, highly practical for the yarns processed).

"Staple" cradles and aprons. The cradles are cadmium finished.

Whitin Unitrol. This top roll and weighting arrangement consists of a strong, smooth surfaced arm containing pre-calibrated springs providing the following weighting front to back: 30, 15 and 15 lbs. The front top roll has four antifriction bearings; the middle and back are non-lubricated type.

New traverse motion.

Revolving front clearers.

Also on four of the older frames, the mill installed new head ends and builder motions. The mill applied new type overhead cleaners, open type creels and pneumatic waste removal units to the frames at the same time.

Improved Performance

The installation has proven entirely satisfactory to the mill management for its performance and in meeting the objectives desired. Yarn breaking strength is up on the average approximately 15% and ends down per thousand spindle hours reduced by approximately 40%. Spinning operators do everything, including picking the rolls. The number of spinners needed was reduced 50%.

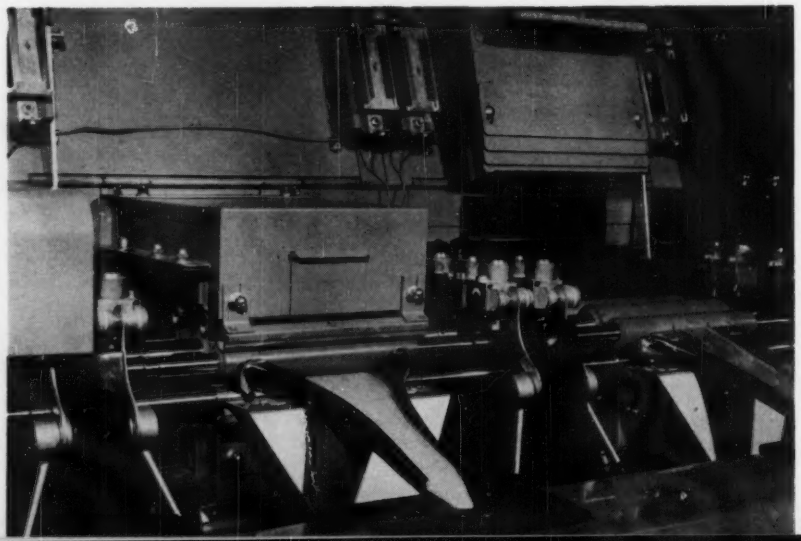
Production Data

The performance of the modernized equipment is shown in the following typical data taken from mill records:

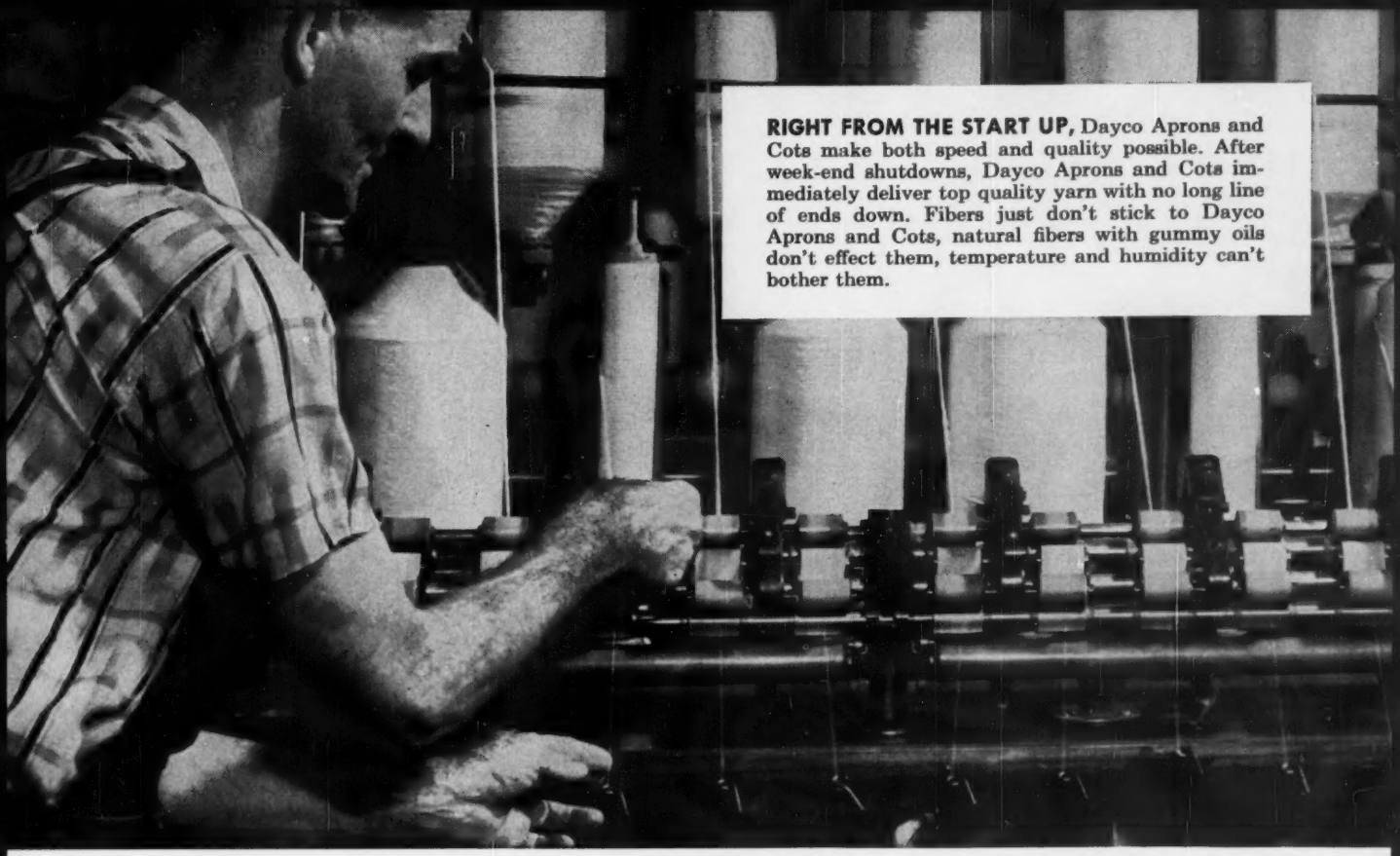
Count (25% Coloray & 75% cotton)	18s	Count (100% Coloray)	12s
Hank Roving	.80	Hank Roving	.80
Roving Bobbin	14" x 7"	Roving Bobbin	14" x 7"
Traverse	9.0"	Traverse	9.0"
Ring	2¼"	Ring	2¼"
Front roll rpm	172	Rront roll rpm	197
Draft	22.6	Draft	15
Twist multiple	3.25	Twist multiple	3.51
Turns per inch	13.8	Turns per inch	12.4
Spindle Speed	7400	Spindle Speed	7400
Lbs./Spdle./Hr. 100%	.0596	Lbs./Spdle./Hr. 100%	.1023
Efficiency %	97.5	Efficiency %	97.0
Nt. Wt. Bobbin	6 oz.	Wt. Bobbin, Net	7.0 oz.
Ends down per 1000 spindle hours	30	Ends down per 1000 spindle hours	12

Improved Drawing Frame

Saco-Lowell's latest model Versa-Matic drawing frame is now available with Pneumafil air suction cleaning. This new vacuum cleaning system retains virtually the same overall height of the Versa-Matic, leaving the top rolls readily accessible when changing roll settings. Specially designed baffles divert undesirable air blast from underneath the frame. Mill and laboratory tests have shown that there is no "stealing" of spinnable fibers caused by excess vacuum in the drafting zone. *For further information write the editors.*



Saco-Lowell "Versa-Matic"



RIGHT FROM THE START UP, Dayco Aprons and Cots make both speed and quality possible. After week-end shutdowns, Dayco Aprons and Cots immediately deliver top quality yarn with no long line of ends down. Fibers just don't stick to Dayco Aprons and Cots, natural fibers with gummy oils don't effect them, temperature and humidity can't bother them.

GET 12% BETTER YARN...TROUBLE-FREE PERFORMANCE

with Dayco Aprons and Cots, the pair for profits

More yarn . . . better quality . . . more consistency . . . these are the benefits that explain why Dayco Aprons and Cots are the choice of superintendents and overseers in leading mills everywhere. They are precision-made to exacting tolerances for modern super-drafting, and high yarn uniformity; precision-formulated for longer, trouble-free life and they outlast all others in oxygen-intensified checking tests.

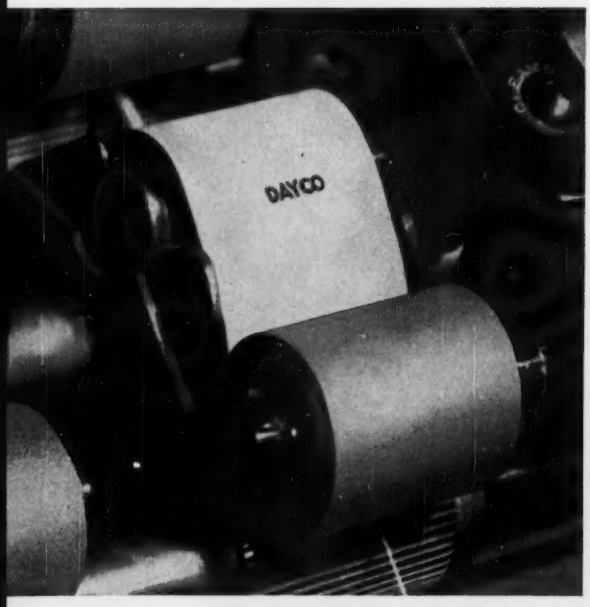
Ask your Dayco Representative to set up a time trial installation with Dayco Aprons and Cots . . . better results guaranteed. Phone or write the Dayton Rubber Co., Textile Division, 401 South Carolina National Bank Bldg., Greenville, South Carolina

Dayton Rubber

D R

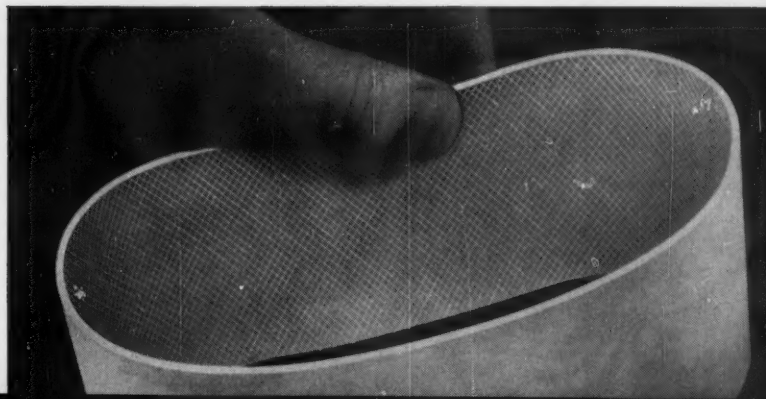
Dayco and Thorobred Textile Products for Better Spinning and Weaving

OVERSEAS PLANT: THE DAYTON RUBBER CO., LTD., DUNDEE, SCOTLAND



DAYCO COTS STAY GOOD AS NEW year after year from buffing to buffing . . . keep all their fine-quality drafting characteristics. Dayco's long-run, top performance makes them the choice in leading mills.

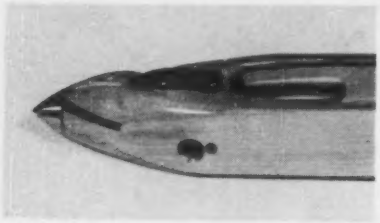
DAYCO'S EXCLUSIVE EMBOSSED DESIGN keeps the shaft clean, cuts your apron drag 50%, prevents tucking and eliminates waste-collecting. No sign of apron chatter either.



NEW MACHINERY EQUIPMENT

Reinforced X D Shuttle

Southern Shuttles has introduced its reinforced XD Shuttle, which has a vulcanized fiber reinforcing strip firmly inserted in the wood near the eye to further strengthen this section and overcome splitting. The reinforcement is said to effectively eliminate the major cause of shuttle failure.



According to Southern Shuttles, this feature is recommended for use in the No. 903 eye dogwood XD Shuttle and extensive tests in mills have shown that the Southern Reinforced XD Shuttle effectively overcomes this major cause of shuttle failure.

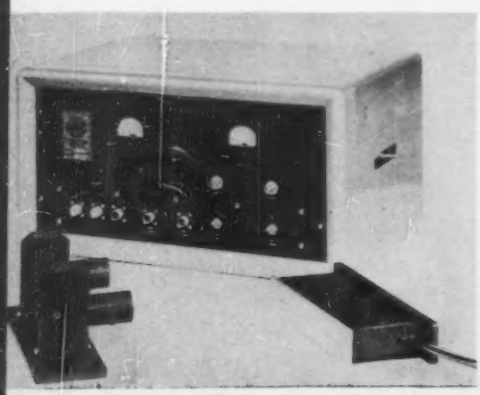
Lubriplate Lubricants

Lubriplate Division of Fiske Brothers Refining Co. has published data book 59-1, describing the characteristics and applications of its line of fluid and grease type lubricants. The 32-page booklet furnishes data concerning the performances of the lubricants for various uses. It includes a geographical list of supply sources for Lubriplate products. *For copies write the editors.*

New Seam Detector

A new seam detector employing two phototubes, and reported to minimize unnecessary down time caused by detectors being actuated by wrinkles, slubs, etc., is being manufactured by Lindly & Co. The two phototubes are so arranged as to receive the same change of light within a small but adjustable time interval of each other. This arrangement is said to prevent incidental wrinkles, or the like, from activating the control unit.

Although developed specifically for application on cotton sheeting, there are many other applications for the seam detector within the textile field, according to Lindly. *For further information write the editors.*



Lindly Seam Detector

Improved Filling Cutter

A new filling holder and cutter, Series 8300, has been introduced by H. F. Livermore Corp., Boston, Mass. The device is described by the manufacturer as an effective solution to the problem of seconds resulting from drag-ins and sidelines caused by wear or lag of fiber holding blades. It is said to represent a complete departure from the conventional thread cutter in action and material.

The new part can accommodate, without any adjustment, all types and sizes of filling yarn, including cotton, rayon and glass fiber yarns. Its hardened steel gripper holds the filling firmly in a straight line before and during the cut. There is no fiber to wear, the manufacturer points out, and no bending of the filling as with conventional cutters. The new loom part has been tested on 800 looms under actual operating conditions. *For further information write the editors.*

Whiting Spooler Conveyor

Whiting Products is marketing the Whiting spooler conveyor, designed to save on labor, yarn damage, floor space and yarn trucks. The conveyor carries all spun yarns. Other Whiting items for offsetting climbing production costs are bobbin conveyors, dumpers, elevators, lowervators, drop conveyor chutes, yarn trucks, vats, tanks, stainless and carbon steel piping and ducts, and specially designed machines and equipment. *For further information write the editors.*

Temperature Test Chamber

The FRL Extreme Temperature Test Chamber, a new apparatus facilitating the study of nonrigid materials at extreme temperatures, is being marketed by Fabric Research Laboratories. The new apparatus is designed principally for use with Instron tensile testing instruments and makes possible tensile and compressional tests at a temperature range from minus 95 degrees F to plus 1,000 degrees F. The FRL chamber, in conjunction with the Instron, permits the use of most normal jaws and allows for tensile testing of 10-inch samples with up to 80% rupture extension. The chamber is built under license from FRL by Custom Scientific Instruments. *For further information write the editors.*

Nylon-Rubber Adhesive

Reevestrip Adhesive for bonding oriented nylon strip to neoprene has been developed by Reeves Brothers. It can be used with the same equipment that is used for bonding neoprene to other materials. It is also suitable for bonding nylon strip to nylon strip. Before Reeves began commercial production of oriented nylon early last year, American industry's supply of the product came from abroad. Its primary use is as core material in the making of power transmission and conveyor belts. *For further information write the editors.*

Thermal Elements

"The Story of the Spencer Disc," describing the origin and operation of the snap-acting disc type thermal element, called the Spencer Disc, is now available in a 29-page booklet. The booklet, published by Metals & Controls Division of Texas Instruments, Inc., details how the disc actuates Klixon thermostats, circuit breakers, and inherent overheat motor protectors. *For copies of the booklet write the editors.*

There's no limit to the lace patterns with the NEW KIDDE 24 BAR RASCHEL KNITTER

Look at the lace in the picture. Every one of those intricate and varied patterns can be made on a single machine . . . Kidde's new 24 bar knitter. Look again at the quality of the lace . . . at the fine detail and the clear outlining of the pattern. That's quality lace turned out at moderate cost.

This new addition to Kidde's line of Raschel knitters is built to operate with 24 bars . . . but can be used with 14 or 18 for less intricate patterns. It turns the lace out fast, too . . . up to 300 courses per minute.

Like all Kidde machines, the new 24 bar knitter is simple, accessible and easy to work on. Equally important, it is ruggedly built to withstand round-the-clock, high speed operation. Write to Kidde for full information.

TRICOT AND RASCHEL MACHINES • TRICOT WARPERS • HORIZONTAL WARPERS • BEAMERS
CREELS • SLASHERS • WINDER-REDRAWS • TENSOMETERS • TENSION COMPENSATORS

Kidde

TEXTILE MACHINERY CORPORATION — BLOOMFIELD, NEW JERSEY

Tire Cord Materials

(Continued from Page 38)

The new viewpoint considered glass as a material of high tensile strength, low extensibility and a short rupture cycle. This inherent characteristic of glass (neglecting its self-abrasion) led to the conclusion that the tire design, as such, should be patterned after a wire tire construction and not a fibrous tire construction.

Test tires have been built and wheel and road tested. Results were better than previous efforts. The test tires failed again because of filament abrasion and adhesion difficulties. Cord breakage and ply and tread separation at 1000 miles or 1100 miles was the high average test result.

Despite the rather negative results in the past, there is a current interest in glass fiber tires outside the United States by major producers employing competent research and development personnel. A special glass fiber laboratory is being planned for continuing these special efforts.

Glass to rubber adhesion, ply to bead adhesion and specialized tire construction are being objectively studied. A main effort is being applied to filament finishes or lubricant to reduce abrasion and, therefore, to increase fatigue life. Some marked improvements in this direction have been noted to date and this work will most probably be intensified in the near future.

Although these developments in glass fibers are not on a scale beginning to approach a major effort to develop new tire cord materials, there are the apparent possibilities that the technical problems are reasonably near a practical solution. Figure 4 depicts a typical elongation curve of a fairly successful glass filament cord.

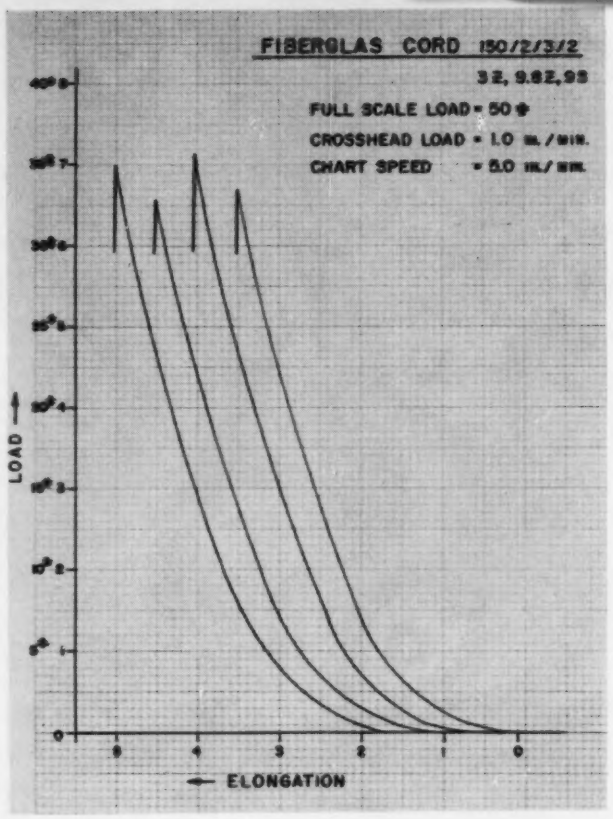


Figure 4

The Polyurethane Group

European development over the past three or four years indicated the seeming superiority of polyurethane polymers for tread stock. Polyurethane rubber treads or Vulcollan or Adiprene have shown tread life to a 50% residual tread depth at 28,000 miles test wheel operation.

The fiber industry has long suspected that the polyurethane family would likely provide a monofilament of exceptional good fatigue and tensile characteristics. It was reported that several years ago, the European fiber industry in cooperation with its chemical industry had developed an all-polyurethane tread and polyurethane fiber carcass. It was likewise reported that the test wheel results indicated a tread life expectancy of 75,000 miles or more. It is expected that future announcements from Europe will verify those test mileages.

European announcements of the production of polyurethane fibers in heavy denier constructions give credence to the report of tire cord of polyurethane which reports have been prevalent in Europe for some time. What future developments will be, remains yet to be seen. Although no technical information has been given, the possibility of this fiber development becoming important is excellent.

Future Fiber Possibilities

There are several other fibers being produced here and abroad which may have some qualifications for tire cord use. Both are relatively little known fibers but the producers of each feel that, with future developments and advances, these fibers may find their way into the large tire cord market because of their seeming characteristics.

Polypropylene is an American newly produced fiber which seems to show some promise. Although it is generally thought to be deficient in thermal qualities, there is a likelihood that this seeming deficiency can be overcome. Its other known qualities point to some tire use possibilities. Future announcements to this effect may be forthcoming. If the preliminary tests prove the material suitable, it is quite likely the tire development work will proceed at an increased pace.

Another material which can hold some promise for tire use is the vinylidine chloride monofilament which is now making its American debut. As yet, the deniers produced are too fine for heavy tire use and the characteristics the material possesses seem to make this fiber worth some further experimental work.

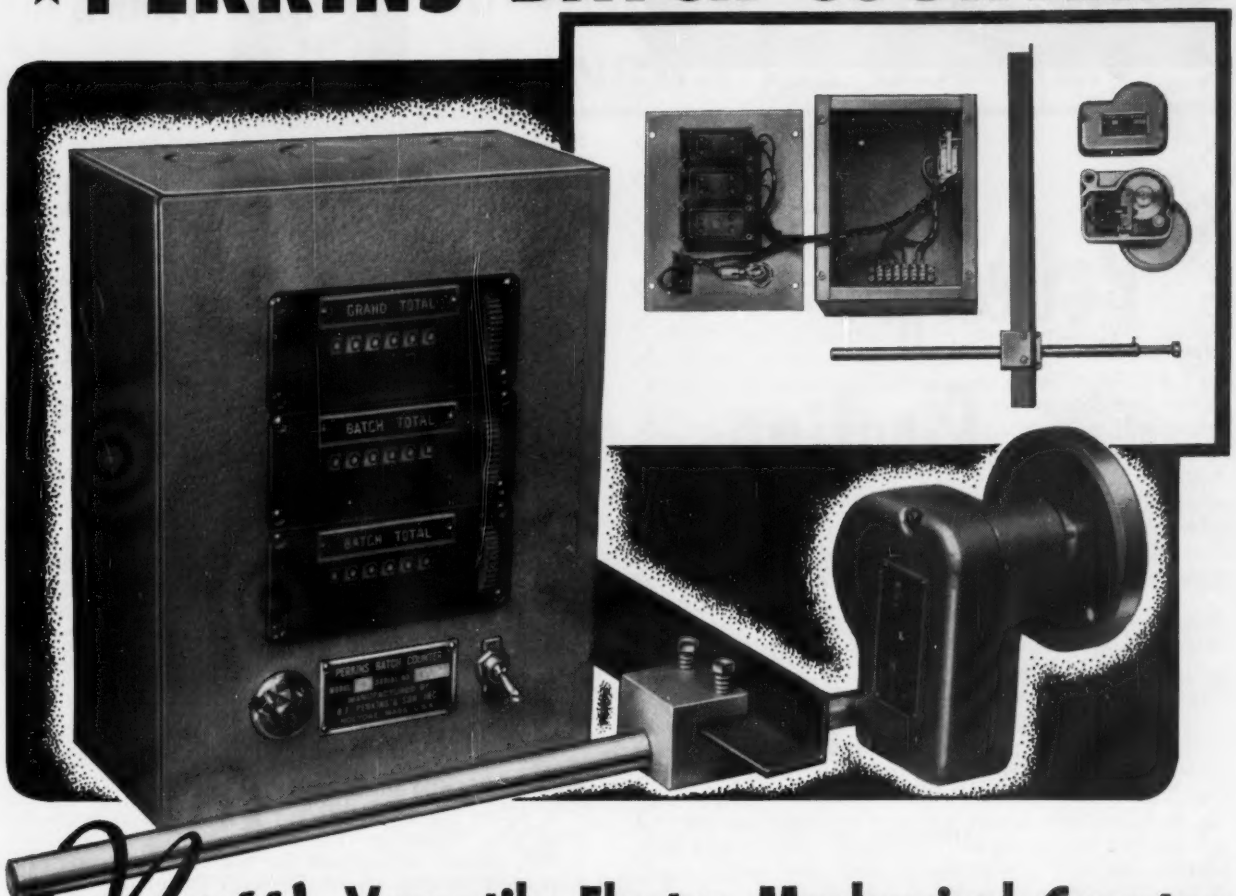
Another fiber development is a Japanese material called Urylon. It is a chemical combination of urea and amide polymers and is currently in pilot plant production. The original use conception of its developers was for apparel textile purposes and, as such, to the recent past, developmental work has been restricted to this end use.

The material, in its present state, develops about 6 to 7 grams per denier tenacity, has ultimate elongations of approximately 22%. Its moisture resistance is 0°, under any and all moisture temperatures. The thermal stability, so far as it is known, is equal to conventional accepted cords.

Little work has been done on this material to date and so far as known, the adhesion system is still undeveloped. Its present cost will be reasonably good, especially when volume of the materials builds up. It is anticipated that future test work for tire use of this

(Continued on Page 56)

★ PERKINS BATCH COUNTER ★



New Versatile Electro-Mechanical Counter for Continuous Production Machinery

... *Eliminates human error*

Use it on your automatic winders. It registers the exact total yards in each batch and retains the total until the operator can record it. Each batch is measured from its exact beginning to its exact end. The total production for a day or shift is also registered. Use it for counting the pieces going into lots where the weight or the size of a container limits the lots. The action that separates the lots also separates the count. Each lot total is retained while the next lot is being counted. Will count any kind of material, being separated into lots or batches, provided an electric impulse can be obtained.

Visit us at the American Textile Machinery Exhibition
Atlantic City, N. J., May 23–27, 1960
Booths 163, 164, 169, 170

B. F. PERKINS & SON, INC.
HOLYOKE, MASSACHUSETTS

NEW FABRICS

NEW YARNS

Nylon Tricot Satinette

As part of its research program to establish a family of tricot fabrics, Du Pont has announced Nylon Tricot Satinette, a new fabric said to offer not only the touch and feel of satin but also a gleaming look. The Satinette is the second result of the research program, and like the first, Tissue Tricot, which was introduced a year ago, receives a special finishing treatment called Schreiner calendering.

The secret of the luster is a multifilament 30 denier Du Pont nylon yarn. Through the heat and pressure of the calendering, the basic tricot structure is changed, flattening the cloth so that it has a smoother hand, greater whiteness and opacity plus a satin appearance. It is the extra filaments in the yarn which provide the light reflection necessary for a lustrous effect.

While the initial application of Nylon Tricot Satinette will be in lingerie, it is expected to be used eventually in other areas of women's wear.

New Pile Fabrics

Two new lines of deep pile fabrics of Dynel and Verel for men's cold weather outerwear garments have been introduced for Fall, 1960, by Glenoit Mills. Called Glenshaggy Frosted and Glenmist, the piles are special blends of Union Carbide Corp.'s Dynel and Eastman's Verel modacrylic fibers, with a knit backing of triacetate and acetate. The pile facing comprises 70% of fabric construction, the backing 30%. *For further information write the editors.*

New Wash-n-Wear Blends

A 50-50 blend of Beaunit Mill's Vycron polyester fiber and American Viscose's Avron, high strength rayon, is said to account for the higher strength in four new fabrics exclusive with Ponemah Mills. A voile, crepe, twill and faille, all automatic wash and wear, are now available in this blend. The fabrics have a soft, pliant hand, good dye affinity, and good wrinkle and pilling resistance. *For further information write the editors.*

Nylon Shoelaces

Lincoln Lace & Braid Co. is introducing shoelaces made of Du Pont's Taslan textured nylon yarn. Laces are offered for both original and replacement use in men's, women's and children's shoes, with initial colors including black, white and two shades of brown. The new texturing process is said to keep the laces tied properly and give them added life. Previously, nylon shoelaces, though excellent in many respects, were slippery and often came untied. *For further information write the editors.*

New Propylene Fabrics

Dawbarn Brothers, Inc., has developed a new propylene fiber, DLP 55, designed specifically for use with outdoor furniture. Dawbarn reports its advantages include: less expensive than other manmade fibers used by the webbing and outdoor furniture industries, since it weighs less; colorfast; neater tensile strength than competitive yarns; has controlled resilience; good resistance to chemicals, abrasion, flexing, scuffing; dimensionally stable; and good strength retention outdoors.

Dawbarn recently enlarged its plant facilities another 50,000 square feet, 90% of the new space being devoted to production of DLP 55 and similar propylene yarns and fibers recently introduced by the company. *For further information write the editors.*

Injunction Against Copying Upheld

A recent decision of the United States Court of Appeals for the Second Circuit will be of interest, the Textile Distributors Institute believes, to everyone who favors the cause of better protection of textile designs against unauthorized copying or "pirating" as it is known in the trade. In effect, the decision affirmed the lower court in granting a temporary injunction against copying of a copyrighted textile design. According to TDI's counsel, two main points were decided on appeal:

1. Where the design in a fabric used in a dress is somewhat different from an original copyrighted design but if an ordinary observer "unless he set out to detect the disparities" (between the two designs) would be disposed to overlook them and "regard their esthetic appeal as the same", then there is a copyright infringement.
2. Where an alleged infringer claims that the copyright of plaintiff is invalid because the copyright notice was put on the selvage of the fabric but this notice became obscure when the fabric was cut and sewed into a dress (either because the selvage was cut off or was sewed under at the seams so as not to be visible unless the seams are cut open), then the copier who claims this defense has the burden of proving that the copyright notice could have been embodied in the design in a way that it would not have been obscured and which would not have impaired the market value of the product. The Court of Appeals in this decision held that on the record before the Court the defendant (alleged copier) had offered no evidence on this subject and thus the temporary injunction was affirmed. This means that when the entire issue comes up later in connection with the taking of testimony and evidence in connection with the possible permanent injunction, then the defendant can present evidence on this subject.

As is seen from the above, this is a quite complicated and technical legal matter which you may wish to discuss with your own counsel. It should also be noted that since the decision of the Circuit Court of Appeals was not unanimous, it is very possible that this matter (on the temporary injunction) will be appealed to the Supreme Court of the United States.

TDI Cautions on Contract Changes

With regard to the use of the Textile Distributors Institute recommended finished goods contract, Miss Hilda A. Wiedenfeld, Executive Director of the TDI, recently sent members the following bulletin which may be of interest to textile distributors generally:

"As you know, this organization spent considerable effort in preparing and suggesting recommended finished goods contract provisions applicable to sales of piece goods. It is our feeling that these provisions are correct and just from the standpoint of all parties concerned, and we are under the impression that most of our members are using them.

"It has come to our attention that certain of your customers, in placing orders with you, are refusing or delaying in the signing of your contract but as and when you submit your contract, they, in turn, forward their purchase order including contract provisions prepared by them, which in many respects are completely different from yours and, often, very one-sided.

"We are herewith alerting you to this situation. As you know, the sales contract of the Seller normally is used rather than that of the Buyer. You are entitled to sell your goods upon such terms and conditions as you think proper and each member individually is in a position to refuse to accept any customer's contract or written purchase order and to insist on the use of his own finished goods contract."

Search for New Markets

A study of ways in which the textile industry or Government might strengthen demand for woven fabrics will be made under contract by the International Statistical Bureau, Inc., for the Department of Commerce. The study will involve an analysis of long-term trends in the textile industry. Findings will be completed after mid-1960 and will be made available to the industry. This is the fourth in a series of studies of textile problems by the department.

Evaluate Acrylic Yarn

An evaluation program on textured Fiber T, an experimental acrylic filament yarn developed by Carbide & Carbon Chemical Co., producers of Dynel modacrylic staple and tow, has been undertaken by Huntley Knitting Mills. Huntley is reported to be checking out the knitting and performance properties of the new fiber for ladies' sweaters and men's sweater-shirts. The yarn is a 200 denier product textured on one of the conventional texturing systems. It is described as similar in appearance to Orlon Cantrece, Du Pont's Type 81 acrylic filament yarn.

U.S. Olympic Uniforms

For the first time the United States Olympic Team will be outfitted in wash-and-wear official dress uniforms when it travels to Rome for the 1960 Summer Olympics. Slacks and blazers for the male athletes are being made by Thomson Co. and A. Sagner & Sons, respectively. These will be 70% Acrilan acrylic fiber, blended with rayon and acetate. The women's uniform, which will feature interchangeable separates to be worn for various types of functions, is also being made of Acrilan. Collegetown of Boston is making the women's outfits.

Hardman of Harmony Grove

(Continued from Page 23)

that they put him in full charge of the mill with the title of vice president. Upon his father's death in 1937 at the good age of 81, young Hardman was made president.

Even before he was given that title, Hardman had been doing some serious thinking about the future of Harmony Grove Mills. He had come to the conclusion that the mill was badly in need of thorough modernizing and re-equipping. "What we had," he recalls now, "was a 1903 model mill and the year was 1937. We had to modernize to survive."

The task of modernization which Hardman set for the mill and for himself was not an easy one. Harmony Grove was a small outfit, and modernization is always expensive. The older men among the officers and directors, as old people often are, were inclined to be satisfied with the way things were and to resist the idea of change, especially when change meant incurring substantial expenses. So Hardman carried out his modernization program step by step at a pace sometimes far slower than he liked, but one which was dictated by the circumstances of the mill.

An Eye on the Market

As he bought new equipment, he studied the market for fabrics looking for a place where Harmony Grove, with its relatively small production and limited resources, might operate profitably. He found it in the continued making of sheetings for the bag trade and drills for the industrial market; for many years the mill concentrated on these goods.

In the 25 years since Hardman first began his modernizing efforts he has kept at it knowing that modernization is a never-ending process and not something that can be finally achieved and then forgotten. Harmony Grove Mills today is as neat and modern a mill for its kind of production as can be found in the textile industry. Hardman and his associates in management, C.W. Hood, Jr., (whose father and brother were among the mill's original founders) and Johnston McCorkle, superintendent, take an understandable pride in saying that not a piece of machinery in the mill predates 1942 with the exception of a few cards and a couple of spinning frames that have been rebuilt and modernized. Most of the major equipment of cards, spinning frames and looms is far newer, of course; and the process of keeping the mill modern still goes on and will continue to do so, Hardman is determined.

Just as the plant and its equipment have been expanded and modernized, so have the fabrics manufactured been changed to keep up with the times. About ten years ago the inroads of paper made the production of cloth for the bagging trade increasingly precarious. Hardman and his associates gradually shifted over to apparel fabrics. Today the mill weaves cotton drills, twills and sateens largely for converters and for the work and sports clothing trade; it also makes a range of industrial fabrics.

With a total of 29,000 spindles and 600 looms all manned by some 600 workers, Harmony Grove, while not a giant operation, is nevertheless too big and substantial to be considered a small mill. Hardman, Hood and McCorkle are quite willing to regard it as a medium-sized mill and they are content that it will remain so.

It is their pride and satisfaction, that regardless of size, Harmony Grove is a reasonably profitable operation and that it fulfills, on a scale greater than ever, its original primary function, envisaged by its founders 67 years ago, of serving as a source of employment and wage-earning prosperity for the good people of Commerce (pop. 3350) and the surrounding rural areas of Jackson County, Georgia.

It is also the pride and satisfaction of Hardman and his associates that Harmony Grove Mills is truly a community operation. Many of the millworkers and their parents were delivered at their births by Hardman's father, Dr. L. G. Hardman, Sr. and his uncle, Dr. W. B. Hardman. For many of them, their jobs in the mill, important as such jobs are, are only one of their breadwinning occupations. Workers at the mill have their own farms which they till in their spare time; many are poultry breeders—an important rural industry in Jackson County.

These mill and country people regard the mill president, L. G. Hardman, Jr., as one of them. He has known most of them all their lives; he and his wife visit them in their homes; and they are accustomed to seeing Hardman in and around the mill day and night. As a past president of the American Cotton Manufacturers Institute (1957-1958) Hardman is active in the broad affairs of the textile industry and finds himself on these and other matters doing a great deal of traveling.

But he is never away from Commerce for long. Often on returning from a business trip at night, he will take time to walk through the mill seeing how things are going and chatting with workers on the night shift. He rarely takes a vacation; his business interests including the operation of the mill and the supervision of the Hardman family farms and orchards give him, he says, all the diversion he needs.

A Man Who Loves Textiles

Hardman has a great enthusiasm for the textile industry and a warm sense of gratitude toward it for providing him with an interesting, and challenging career. He looks back upon his year as president of the ACMI with keen appreciation. It was, he says, one of the happiest years of his life. He is grateful for the opportunity his service as an officer of the Association gave him to meet and work closely with other leaders of the industry whom he regards as the finest group of men in the world; men of unsurpassed integrity and good sense.

With so great an enthusiasm for textiles, it goes without saying that Hardman is optimistic about textiles' future. He looks forward to a day when the changing relation of productive capacity to a growing demand will make textile manufacturing more profitable than it has been during his three decades in the industry.

But like all thoughtful leaders of the industry, he is deeply concerned over the growing menace of low-wage foreign competition. He considers the only practicable solution to this danger would be a system imposed by U. S. law of equalizing foreign production costs with production costs in this country. We must give our textile industry and the people who depend on it for a livelihood an opportunity to compete on an equal basis with foreign producers, he says. How such "equalizing legislation" can be put on the statute books is admittedly a difficult task. But we must all work to achieve it, if our industry is to survive, he firmly believes. ■

PAPERS OF THE
AMERICAN ASSOCIATION FOR
TEXTILE TECHNOLOGY INC.®

AATT

Physical characteristics — their effect on wash & wear

By Walter J. Hamburger

THERE ARE TWO, and probably only two, justifications for a scientist to speak formally. One is to present the results of research completed or in progress that these may be applied to practical problems. The other is to philosophize on general conditions which exist in order that deductions may be made which will guide the paths of future research. This paper falls into the latter category and, of necessity, poses more questions than it answers.

Wash and wear or ease of care both are rather nebulous phrases that have become commonplace. Everybody understands what is meant until pressed for a definition. Semantics notwithstanding, one can legitimately express dissatisfaction with the way these fabrics wash and the way they wear. This is no indictment against the people who produce them; it is rather a stipulation that wash and wear is a very complex proposition. This writer would be the last to play down the skill, ability, and craftmanship existing in the mills and the many hours of time that have been spent in an effort to improve wash and wear materials. As a matter of fact, the problems discussed here should make the already-accomplished improvements in wash and wear appear all the more impressive.

It should also be clearly understood that there are fundamentals involved in wash and wear of which we have very little understanding and it is to be doubted that the perfect wash and wear fabric will be developed until these areas are thoroughly probed. Discussion here is limited to a few of these: particularly the considerations that effect wrinkling and surface deformations in wash and wear materials. First, some background.

Wrinkles, creases, and surface deformations are all influenced by the ability or lack of ability of fibers, yarns, and fabrics to deform. It makes little difference whether you call them wrinkles, creases, corrugations* or whatever; they are disturbances, subtle or sharp, on the surface of the fabric which in some conditions are not desirable. The deformability of the entire structure makes possible these disturbances and fabric deformability stems basically from fiber behavior characteristics such as resistance to deformability, recoverability from tension and bending, and response to all pertinent environments. Swelling,

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* However, because of increasing attention that this problem will receive and because there is yet no standard it is advisable to establish for this paper ground rules of definition. From a physical and mechanical point of view there is no difference between a crease and a wrinkle although they may differ in severity. Consequently, the definition must depend upon the "why" rather than the "what" of the distortion. A wrinkle is an out-of-the-plane surface distortion, however sharp, which aesthetically should not be present, although a wrinkle may be imposed for experimental study. A crease is a sharp fold with aesthetically hoped-for permanence. Exception: fabrics such as seersuckers and crepes, with intended permanent distortion, may be termed to have wrinkles.

Dr. Hamburger is director of Fabric Research Laboratories, Dedham, Mass. A graduate of Massachusetts Institute of Technology, he holds the degree of Doctor of Philosophy in polymer mechanics from Brooklyn Polytechnic Institute and the honorary degree of Master of Science from Lowell Technological Institute. He delivered the Marburg Lecture in 1955 before the annual meeting of the American Society for Testing Materials. He is the author of numerous articles and papers on subjects related to textile technology and research.

Walter J. Hamburger

shrinkage, and other factors which cause changes in freedom of motion of fabric components are also involved, as are yarn size, twist, thread spacing, yarn packing, filament denier, weave, calendering, and fabric structure. All of these influence the fabric's ability to recover from strain or, loosely in lay terms, to be free of wrinkles.

Obviously, therefore, there can be two extreme approaches. We can design a fabric which will deform easily under certain circumstances and remove the deformations with comparable ease. In fact, they may remove themselves spontaneously in a relatively short time and, of course, there are sound mechanical reasons why this happens. At the other extreme, we can design a fabric which will resist deformability, but it follows that when this fabric does deform the deformations will be comparably difficult to remove.

Fig. 1

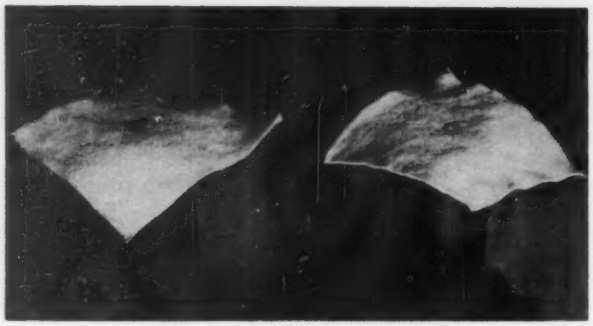


Fig. 2

Worsted Fabric C (All Wool)
Two views oriented 90° to each other
Warp 1/25 20 Z Filling 1/25 20 Z
Fig. 1—Fabric in 70°F 65% R.H. Atmosphere
Fig. 2—Fabric in 70°F 95% R.H. Atmosphere
Note some surface distortion and relative freedom from curl.

The balance between extremes is not known. There are many, many properties—some mentioned above—which govern whether a fabric will deform easily or deform with difficulty. By choosing fibers of given properties we can create a fabric where the immediate elastic response will be great. The delayed elastic response may also be great. This means that if we are lucky enough to develop such an article, we have—if there are deformations—rapid recovery.

On the other hand, the immediate elastic deformation may not be great but the delayed elastic deformation may be great, meaning that there will be a considerable wait while recovery takes place. A carpet which has been weighted with a piece of furniture is an example. It doesn't immediately recover but under certain circumstances of construction, in a reasonable length of time, the deformation—perhaps with a little assistance—will disappear. One can hardly wait this long if he is talking about wash and wear clothing.

So, briefly stated, we are dealing with some rather complex and not necessarily compatible, physical properties of fibers, yarns, and fabrics. And this is very far from the whole story.

A good wash and wear fabric, of course, must do more than come out of the washing machine or drier in a wearable state. It must resist wrinkles and maintain creases *during wearing.* The above-discussed variables still are all involved as are some more specific problems which will be discussed below. But what about environment? We are talking about behavior during environments from the soaking of washing to the heat of drying to the hundreds of environmental conditions which are encountered when the material is worn.

Fig. 3

Fig. 4

Worsted Fabric D (All Wool)
Two views oriented 90° to each other
Warp 1/25 20 Z Filling 1/25 20 S
Fig. 3—Fabric in 70°F 65% R. H. Atmosphere
Fig. 4—Fabric in 70°F 95% R.H. Atmosphere
Note opposing twist directions (warp and filling) result in severe curl

None of us can be certain about the environment into which we place a carefully designed fabric. The whims of weather are not yet controllable by man nor, in fact, very predictable by the weatherman. Further, when we introduce—in addition to the ambient conditions of the atmosphere—washing procedures, we introduce a controllable (initial work on desirable control has been reported by Hoffman & Wilkinson (1)), mechanical action—heat and moisture in washing machines or even in hand washing. So we have the ambient conditions of washing and drying time and we have the in-use time. Will the fabric be worn in 70° weather with a humidity of 65% or will if be worn in some other undefined climate? Probably the latter.

We do not have control over these variables and a pattern is now becoming obvious. What is sought is a

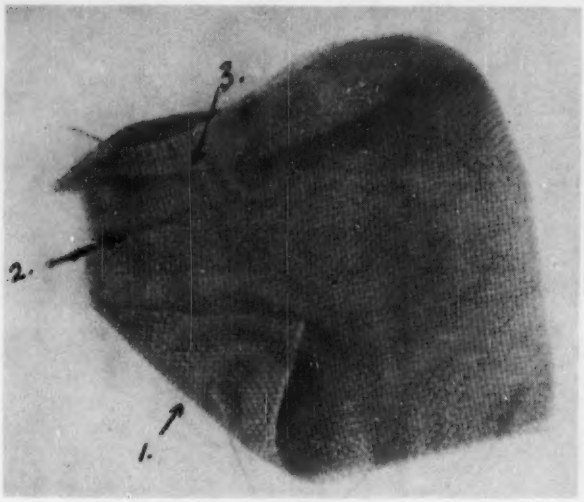


Fig. 5—Tropical Worsted Fabric (All Wool)
5.0 oz./sq. yd. Fabric randomly wrinkled.
Crease 1—Bias, moderately sharp.
Crease 2—Two sharp crease reversals.
Crease 3—Single sharp crease.

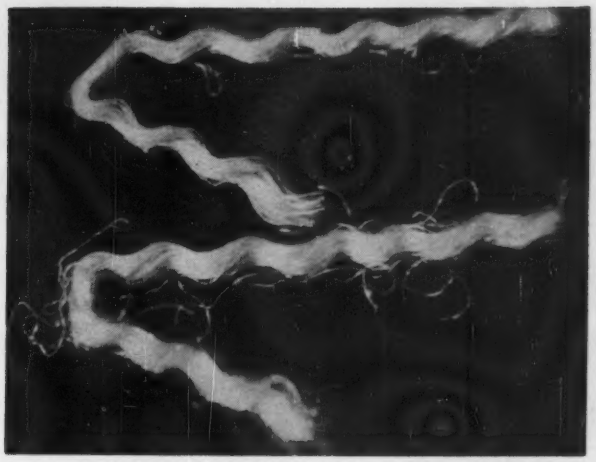


Fig. 6—Two Successive Yarns from Crease 3 Fig. 5
Top yarn illustrates pointed node
Bottom yarn illustrates squared-off node

Fig. 7—Yarn from Crease 2 Fig. 5
Note Z-shaped double crease formed by a pointed node and a squared-off node

chameleon type of fabric, one which will accept and take on the hue of varying environments without stipulating at any time (a) which hue and environment it will encounter and (b) under what conditions it will encounter the environment. This is a pretty big order; one can not wave a wand and get the answers, nor can the problem be solved empirically; nor, in fact, is it necessarily even possible to solve.

So far we have discussed only basic fabric structural elements and environments and in rather general terms. There is much more which we can heap upon an already complex situation. Again, problems will be posed and answers not given but some preliminary observations will be reported. Specifically, let us try to throw some light on (1) the relationship between fabric curl and wrinkling; (2) observations made of yarn and fiber deformations at a wrinkle; and (3) fabric surface distortions.

A textile structure is the only sheet-like material which is light, permeable to air and moisture vapor, tough, flexible, and strong. Such a unique structure must, of course, have complexity and, indeed, it does. In attempting to maintain on it a constant surface appearance we are not dealing with simple phenomena.

There is, of necessity, a resistance to or propensity for bending and these factors are extremely important in wash and wear fabrics. Here it is critical to understand how a fabric bends or, in other words, the direction of wrinkles relative to warp and filling. In laboratory tests we generally impose a sharp fold at a right angle to either the warp or filling. From such a fold, either the recovery angle or the crease angle (depending upon the tester used) is determined.

But, in fact, is this the way the fabric would normally wrinkle if left to its own devices? Obviously, wrinkling will occur at the place where the bending resistance, or torsional rigidity and bending rigidity, are least and this may be at the intersection of the yarns or, in the bias direction. In a completely square fabric this is a 45 degree bias and in a fabric of any other dimensions it could be at any angle.

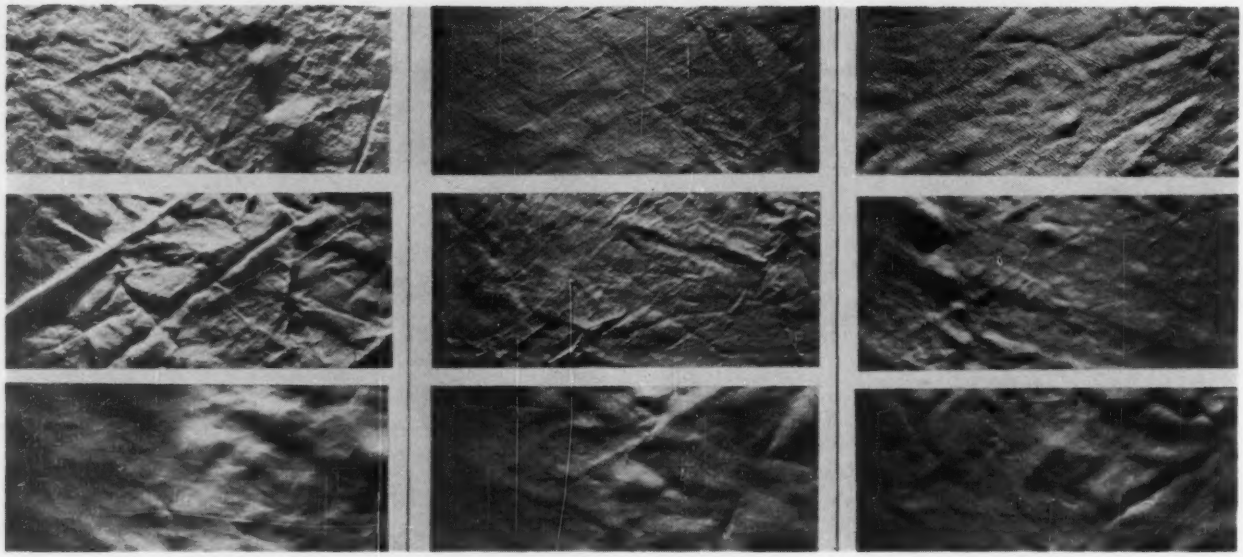
This bias bending, as it influences wrinkling and creasing, is a condition which has been a stepchild; it has been overlooked. And *maybe* this is the place; this is the phenomenon; this is the mechanism whereby development of the fabric of the future, the perfect wash and wear fabric, lies.

The orthogonal elements (yarns) which comprise the fabric govern the type and extent of deformation which the fabric will suffer. The extent to which the deformation occurs and the type of deformation will likewise govern the strain level which will exist in the fabric as the result of deformation. The factors which influence a fabric's ability to recover from strain have been mentioned previously.

Because the fabric structure, for a given state of deformation, influences the fiber strain level, this, in turn, will influence the recoverability both in type and extent. For example: If, in bending, the strains which are developed on the outermost side of each individual fiber (tensile strains) exceed the yield point of the fiber, a permanent set will take place and that fiber will not have the opportunity to restore itself to its original configuration without some sort of external assistance such as wetting out, steaming, or some other means of swelling recovery.

In addition, all fibers, attempting to recover from a variety of strains, are in turn restrained to some extent by each other, i.e., friction, steric hindrances, etc. Clearly then, there must be sufficient strain energy associated with the fiber in the bent state so that upon removal of the external deforming force (weight, for example) these restraints can be overcome.

Unfortunately, the bias bending is not solely a simple bending phenomenon. It involves at least both bending and torsion. The extent of torsion will depend upon the twist of the yarn and the torsional



29A 30A 31A

Fig. 8—Surface of Washed Rayon Taffetas

29A-6.25 den/fil 80x52 (Greige) 150 den yarn—30A-3.75 den/fil 80x50 (Greige) 150 den. yarn—31A-2.50 den/fil 80x52 (Greige) 150 den. yarn
Top row—Greige fabric washed—Middle row—Commercially finished fabric washed—Bottom row—Resin-treated fabric washed.
Note influence of filament denier on surface appearance.

rigidity of the fibers, both of which contribute to the response or torsional resistance of the yarn. Consequently, in bias bending, we must consider recoverability and energy of restoration not only from bending strains but from torsional strains as well.

If there is an unbalance of torsional strains between warp and filling yarns the fabric may curl on the bias. A fabric of this sort may also have a marked tendency to wrinkle in the bias direction and wrinkles tend to form more easily in the direction of curl than in the direction opposing curl. (See Figures 1-4)

Next, let us allude to a study made by Coplan and Golub (2) on the types of yarn and fiber deformations which occur at a wrinkle. No attempt is made here to explain the relationship between this phenomenon, bias bending, and surface deformations (which are discussed below) but possibly a thorough research on all three subjects might establish some interesting relationships.

Very briefly, and the reader is referred to the Coplan and Golub paper, attempts have been made to measure fiber strains at a wrinkle and estimate the magnitude of these depending upon their position relative to the wrinkle. At any one wrinkle some of the yarns are bent in the direction of weave-imposed yarn curvature while others (in a plain weave fabric, for example, the next yarn) are bent opposite to the direction of yarn curvature. In the former situation, much higher fiber strains and therefore poorer recovery are induced than in the latter. Obviously, this further complicates the matter of wrinkle recovery. (See Figures 5-7)

It may be premature to discuss one more phenomenon, surface deformations, because, although these can be physically illustrated, practically no work has yet been done that can explain them. For some time there has been observed in the woolen and worsted and rayon industries a configuration in, for example, a taffeta fabric where there suddenly develops upon moist agitating and subsequent tensionless drying, a series of small wrinkles which run along the bias direction of the fabric and stop when others in the opposite bias direction intersect them. These little wrinkles, these deformations of the surface, form a pattern, apparently spontaneously, and create an appearance that is sometimes referred to as a crow's foot, sometimes as a crepe-like texture, sometimes as a diamond-like pattern; and several other terms have been used.

A fabric's susceptibility to these disturbances of the surface may be a clue to the first place where a piece of basic research should be performed in order to achieve some answers to improved wash and wear fabrics. (See Figure 8)

In conclusion, one may again wonder why this paper, crammed with questions and problems and practically no answers, has been presented. It is perhaps as one might go with his complex human problems to a psychiatrist. The doctor will not be able to say, "Here, take this pill and all will be well." He will have to probe, as we will have to probe, if the answers are to be found. (And the patient will have to provide the wherewithal if he wants the answers!) So here have been presented some of our problems' tangible characteristics which is the first step in isolating and defining fundamental causes.

1. Wilkinson, P. R. and Hoffman, R. M., "The Effects of Wear and Laundering on the Wrinkling of Fabrics", *Textile Research Journal*, Vol. XXIX, No. 8, 1959.
2. Coplan, M. J. and Golub, S. J., "Some Observations on Distortions at a Wrinkle", *Textile Research Journal*, Vol. XXIX, No. 6, 1959.

Discussion

Following Dr. Hamburger's talk there was a question and answer period during which he answered questions submitted by members of the audience. The following is a summary of some of the questions and Dr. Hamburger's answers.

EPHRAIM FREEDMAN (R. H. Macy & Co.): You mentioned that the specimens were washed and tumble dried?

HAMBURGER: Yes.

FREEDMAN: Were any of them washed and drip dried?

HAMBURGER: Those fabrics that were shown here were not washed and drip dried. We found that it was quite possible to get a reasonably good flat surface on those fabrics that texturize; for example, if allowed to drip dry, the diamond formations do not

occur unless there is agitation. Now, strangely enough, if you want these diamonds to develop, you have to start the agitation the minute you start the wetting. If you wet this fabric and let it stay wet for a long time and then put it in a tumble washer or a tumble dryer, and start it going after it has stayed wet for a long time, it may not show this or it may show it to a much lesser extent. If you screen dry and no tumble action and you handle this fabric in the wet state without shaking, then you don't get it.

FREEDMAN: Are you not introducing an element which is not employed in the handling of much of the wash and wear fabrics?

HAMBURGER: I thought the wash and wear fabrics were washed under ordinary household conditions. If you just take a piece of this fabric and put it in a beaker and agitate with a stirring rod, it will go into the texturized configuration.

FREEDMAN: I am not taking issue of course, with anything you said. I merely raise the question, in an effort to ascertain whether or not the impact or strain or stress put upon the fabric as the result of the mechanical operation coincidental to tumble drying, may not have produced a result which would not have occurred if a fabric were merely washed or drip dried, or washed and tumble dried, without the additional drying operation. I mean by that, wash with excess moisture removed and then the article removed from the washing machine.

HAMBURGER: There is no question in my mind whatsoever that the agitation is the important factor. We know that the timing of the wetting and agitation is something we can control to make the effect more or less pronounced. We took hand washed fabric and let it dry to a point where all the solid water was out and then we put it in a tumble dryer at low heat and the diamonds formed. As long as it had any moisture in it, under certain conditions of tumbling, the pattern was evident, though less pronounced. What would have happened if we had it permanently dry, I don't know.

I know when we screen dried we didn't get this, and of course, didn't have the agitation. I don't think we could sell wash and wear fabric if it could only be drip dried. I am sure, from my experience, the best of wash and wear and drip dry will eventually get creases and they are usually around the waist or some place where the humidity is high and they fall in the same place over and over again. You then —heresy!—press them and you are good for three or four or five months which is better than nothing.

FREEDMAN: I agree with everything except after you iron it, it will last for three or four months. I am not as optimistic.

You also mentioned something about freedom of mobility versus resin finish and I believe you mentioned the more you can immobilize the yarns in a fabric, the more difficult it is to remove wrinkles after they have formed.

If it is politic for you to provide the answer, would you say that holds true for the resin treated fabrics?

HAMBURGER: I think some of the resin treated fabrics, depending on how heavily treated, will manifest wrinkles, but once they are in it is usually more difficult to get them out. I don't think there is any question about that. You can go to the extreme and make it so crisp and taffeta-like that you don't even have to work to put it in. You have to work to be sure you don't let the wrinkles get in at all because it is so crisp that it will crinkle like paper.

This is not what I mean. I mean the commercial type of finish which has been put on either advertently or inadvertently for the purpose of giving the fabric more bending rigidity. Such a fabric will require greater force to bend it through the same curvature and, therefore, keep it below the yield point and it does a whale of a good job. When moist or in high humidity atmosphere, the level at which this yield point existed in the dry state no longer exists. The wrinkles develop when in a moist condition.

W. G. BURCKEY (The Du Pont Co.): your statements regarding curling of fabric in 95% R. H. apply chiefly to hydrophobic fibers, do they not? How about fabrics of hydrophobic fibers or high blend ratios thereof?

HAMBURGER: The more hydrophobic the fiber the less the curling that takes place. This is a well known fact. However, it is not actually impossible to get curling to take place in a material made from hydrophobic fibers and this will be stimulated by changes in humidity. It may not be as pronounced but it can occur. As long as there is some moisture uptake a minor degree of swelling can take place. Remember, I didn't indicate that you had to have twist as such to develop torque; you may develop torque by bending and also as a result of imbalance in the system.

S. M. EDELSTEIN (Dexter Chemical Co.): Is there not a complete difference in terms of looking at fabrics which are made from fibers that are spun or woven and set, as distinguished from fabrics which may be made up in a mechanical way with any strains you want in any direction, which are then chemically treated? What I am trying to say is this: it seems to me that all these physical relationships are important as they relate to the hydrophobic fibers that are spun and woven into fabrics and have a minimum amount of chemical changes as against cellulosic fibers which are put into any kind of shape and changed by chemical modification. To me they are two different things. The mathematics and physics are important. In the hydrophobic fibers they are not too important. Is that right?

HAMBURGER: I will say this. You don't have the chemical aspect to contend with as much in the hydrophobic fibers. To be very honest I don't know whether the answer is they are not as important or whether it boils down to the fact that if you could treat a fabric by chemical means, resin or otherwise, so it would behave satisfactorily in the various environments in which it is going to be called upon to behave—then there would be no importance in trying to work out the geometry of the system. Up to now we have found that resin treatment is not a panacea of all ills. If one problem is solved another may appear. Tensile strength, tear resistance and abrasion resistance may go down. Under these circumstances our only hope to produce a satisfactory product lies in modification of the fabric geometry.

K. J. WINTER: Is there not a contradiction between your statement that curling is objectionable for wrinkle resistance while jersey fabrics curl the most and wrinkle the least?

HAMBURGER: Well, I didn't really say that. I simply tried to point out that curling is a phenomenon recognized in knitted fabrics but I also said when I started that knitted fabrics have the wrinkle resistance built into them and that the curl is objectionable because of the fact that it makes it difficut to handle. I pointed out that the mechanism of curl in a knitted fabric is quite different from that of a woven fabric. Also serious wrinkles don't form because of the openness of the knitted fabric. However, this does not mean that curling in a woven fabric might not be the clue to the solution of the problem of wrinkle formation.

Tire Cord Materials

(Continued from Page 46)

material will be done in the U.S.A. in the near future and, if preliminary results prove successful, further tire test work will be done either in the U.S.A. or abroad.

Developments Other than Fiber

Some recent developments which have some bearing on the overall picture have already been mentioned. Another new development, not strictly dealing with fibers or cords, is the current announcement of the polyurethane foam filled rubber tire. The use of semi-rigid polyurethane foam obviates the use of inner tubes, inner lining or any other air retaining membrane within the tire. Correspondingly, the problem of blowouts from any cause, air losses of any type, is completely avoided. The tire is claimed to be completely road worthy and safe even under conditions where any air inflated tire would certainly fail, whether tubeless or dual tube type.

A similar development has been observed over two years ago in Europe. The principal difference, however, was in the carcass construction. The European experimental tire had a completely molded polyurethane carcass also filled with a premolded inner ring (or rings) of cellular polyurethane. Reports, at that time indicated a tire of extreme road or service indestructability and safety. This certainly is a significant development.

It will be readily admitted that, as of now, these experimental tire designs and construction materials are manufactured strictly on a handmade basis and their practical volume production may never occur. However, the point must be accepted that the ideas have been conceived and the preliminary techniques have been worked out and, in fact, the road tested tires are a reality.

Conclusions

At the risk of being a prophet, one can literally hazard the conclusions that the situation, at this time, is as follows:

A) Cellulosic fibers, since their technical reincarnation, are providing a serious comeback for the all important tire cord market.

B) Nylon 66 materials undoubtedly will continue to produce important gains in technical advances and commercial gains in the premium or 1100/1200 level tires of passenger and other sizes.

C) Wire reinforced tires most probably will double in production quantities in the next several years. Emphasis will be on bus and city truck uses on firm and relatively smooth pavement surfaces.

D) Caprolan-type fibers will increase in use volume in near-direct proportion to the cost of this material in comparison with cellulosic and amide materials.

E) The other newer and commercially untried materials mentioned will certainly make a strong future bid for the large tire markets. The polyesters, most probably, will be the first of the serious contenders. Other fibers mentioned are not nearly as advanced in this direction, either commercially or technically.

AATT Topics Announced

Topics of meetings of the American Association for Textile Technology to be held in April, May and June have been announced by the program committee of the New York Chapter. The meetings are held at the Hotel Vanderbilt in New York City starting at 6:30 P.M. A cocktail hour and dinner precede each meeting. All persons interested are invited to attend.

On April 6 the topic will be progress in research on wool and the speaker will be Harold P. Lundgren, Chief, of the Wool and Mohair Research Laboratory, U. S. Department of Agriculture.

On May 4, the meeting will be devoted to a progress report on Aston 123, a durable anti-static agent of Onyx Oil & Chemical Co.

On June 1, the meeting will hear a paper on Du Pont's "Lycra" spandex fiber. Properties of the new fiber will be described, methods of processing it into fabrics will be discussed, and a number of advantageous end uses will be summarized.

New A-Acrilan Trademark

Chemstrand Corp. has intituted a licensing program for its A-Acrilan registered trademark. Formerly an identifying signature for the company's acrylic fiber, Chemstrand's A-Acrilan trademark will now also assume the status of an "ingredient mark" under the terms of the tradmark licensing program. This will permit its use only on fabrications and products made therefrom which contain virgin Acrilan acrylic fiber in percentages established or approved by Chemstrand and determined to provide maximum utility, quality fashion and consumer value.

The new program will not change any other trademark programs of the company for its acrylic fiber.

For the DYER and FINISHER

New Polyester Colors

Francolor Inc. is marketing a brand new line of Esterophile colors, a new group of patented dyestuffs recently introduced by Compagnie Francaise des Matieres Colorantes of France, and especially developed for the dyeing of polyester fibers. Esterophile colors now offered in the U. S. market are: Light Yellow 2RL, Light Yellow 3RLL, Light Red RBLL and Light Blue BJ11 Extra. Although it is recommended that Esterophiles be applied under pressure where best yield and fastness are obtained, it is possible to apply them with a carrier at the boil. *For further information write the editors.*

Polimize Dyeing Process

Althouse Chemical Co. reports its new Polimize dyeing process is now being used by several cotton yarn dyers. Developed after two years of research, the process is said to produce fabrics which are soft to the touch. Labor and material costs are reduced by eliminating the need for added softeners. Polimize processed yarn is reported to become synonymous with fast colors which remain throughout the life of the fabric. *For further information write the editors.*

Surface Active Agent

Low foaming coupled with good rewetting are said to characterize performance of Synthrapol RWP, a new nonionic surface active agent for paper developed by Arnold, Hoffman & Co., especially for use in the paper industry. The agent is described as a water soluble, pale yellow, oil liquid which can be applied to paper by spray techniques or be used as a beater additive in conjunction with wet strength resins. *For further information write the editors.*

New Wetting Agent

A wetting-out and penetrating agent, Padding Auxiliary TX 3032 is offered by Putnam Chemical Corp. Developed by BASF, the new wetting-agent is said to show excellent results so that it can be used on unscoured material with good level vat color dyeings. TX 3032 is said to be particularly useful with pigments, vat pigment padding and jig dyeing. There is said to be no pigment penetration during the drying operation when it is used with the Lumatex pigment system. *For further information write the editors.*

New Surfactant Data

A new 44-page booklet describing the properties and uses of Tergitol surfactants has been published by Union Carbide Chemicals Co. The booklet contains extensive data for eight nonionic and four anionic Tergitol surfactants, including selection, solubilities, properties, formulations, applications, performances, specifications and test methods. *For copies of the booklet write the editors.*

Improved Carrier

Verona Dyestuffs has brought out a new carrier, Levegal D, for dyeing polyester and triacetate fibers. Advantages of the new carrier, according to Verona, are quick dispersability, simplified dyeing procedure, uniform exhaust in combination shades, superior penetration, no effect on light fastness, improved crocking, wash and sublimation fastness and non-yellowing properties. *For further information write the editors.*

Finishers Elect

Godfrey S. Rockefeller, Cranston Print Works, was elected president of the National Association of Finishers of Textile Fabrics at the 46th annual meeting in New York. Richard D. Wood, Jr., Millville Mfg. Co., and Ernest J. Chornyei, Bradford Dyeing Association were named vice presidents and Joseph E. Hoesl, association president, was reelected treasurer. Lawrence Marx, Jr., United Merchants & Manufacturers, was elected chairman of the executive committee.

Hoesl, in his annual report, stated cotton finishing plants made favorable gains during 1959. He noted, however, that while the production level averaged an estimated 6% above 1958, it was still about 5% below the peak reached in 1955.

New Fiber's First Uses

First use of Zantrel in blended sales yarns was announced by Burlington Yarn Co. Four distinctive blends using the recently-introduced Zantrel polynosic fiber have been developed primarily for use in knitwear products. The blends are: 70% cotton and 30% Zantrel, for men's underwear and outerwear, knitted sport shirts, and men's socks; 50% Zantrel and 50% Arnel, for knitted outerwear; 50% Orlon, 40% Zantrel and 10% nylon, for wash-and-wear products; and 80% nylon and 20% Zantrel, for yarns for industrial applications. Zantrel is a product of Hartford Fibres Co. *For further information write the editors.*

Glass Fiber Plant for Holland

If present plans work out, a continuous fiber glass yarn plant will be built in Holland by a joint arrangement between Pittsburgh Plate Glass International, subsidiary of Pittsburgh Plate Glass Co., and Algemene Kunstzijde Unie of Arnhem, Holland.

Currently both companies are conducting a study looking toward the establishment of such a plant. After the study is completed it is expected that the plant will be started. A.K.U. is one of the world's larger producers of manmade fibers such as rayon, nylon and polyesters. Pittsburgh Plate Glass has produced glass fiber products since 1952 and is said to have a good patent position and to be equipped with modern technical know-how in this field.

S & W Parts Distribution

Scott & Williams, Inc., has announced arrangements have been completed whereby The Torrington Co. will distribute all S&W flat parts used in that firm's underwear and outerwear machines, in the U. S. and Canada. Torrington will have a complete stock of flat parts available at its branches in Boston, Chicago, New York, Philadelphia, St. Louis, and Greensboro, N. C. Under the new set-up orders may be sent to these branches of the Torrington Co., or, as in the past, to Scott & Williams' branch offices or direct to the Scott & Williams' factory. The purpose of the new arrangement is to effect prompt delivery of the parts.

New Olefin Rope

Commercial use for the first time of a new synthetic fiber in rope has been announced by Plymouth Cordage Co. The new fiber is Prolene, Industrial Rayon Corp.'s multifilament type of polypropylene produced in both staple and continuous filament form. Plymouth said that ropes made of Prolene promise to find many uses in shipping and industrial applications because of their light weight, high strength, excellent durability properties and outstanding chemical resistance of the fiber.

TEXTILE NEWS BRIEFS

Polypropylene Film

AviSun Corp. has issued a preliminary technical data bulletin, "Some Pertinent Facts on Polypropylene Film." AviSun, recently formed and equally-owned affiliate of American Viscose Corp. and Sun Oil Co., lists in the bulletin the advantages of polypropylene film, described as the lightest commercial plastic known. Physical properties of the film also are detailed. *For free copies write the editors.*

New Zefran Blends

Marketing of new blends of 100% Zefran brand acrylic fiber to meet the needs for acrylic-wool blend apparel fabrics has been announced by The Dow Chemical Co.'s textile fibers department. One blend, "W-2," has an average denier of about 2.5 and sells for 99 cents a pound. The "W-4" blend has an average denier of about 4.5 and sells for 94 cents a pound. The W-2 has an upper spin limit of 8 run and the W-4 has a limit of 6 run. The two basic fiber blends make a wide range of woolen blend fabrics.

(Continued on Page 61)

U. S. MAN-MADE FIBER PRICES

This schedule lists the prices of yarns, staple and tow as reported by the producers in February 1960. All prices are given as subject to change without notice.

CELLULOSIC YARNS

ACETATE

American Viscose Corp.

Current Prices
Effective March 13, 1959

Bright and Dull

Denier & Filaments	Cones & 4-6 Lb. Tubes	Twister Tubes	Warps	Spinning Cones	Twist Warps
		* Intermediate Twist			
40/11	....	....	....	....	$1.04
45/11	....	....	....	....	.93
55/14	$ .99	$ .97	$1.00	....	.77
75/20	.95	.93	.96	$ .89	.90
100/28	.91	.89	.92	.85	.86
120/32	.82	.80	.83	.76	.77
150/41	.74	.73	.75	.69	.70
200/54	.70	.69	.71	.66	.67
300/80	.66	.65	.67	.62	.63

* Standard Twist 2¢ Additional.
Terms: Net 30 Days.

Celanese Corp. of America

Current Prices
Effective March 10, 1959

Bright & Dull

Denier and Filaments	Intermediate Twist 4 & 6-Lb. Cones	Beams	4-Pound Cheeses	Spinning Twist Cones	Beams	O Twist Tubes
45/13	$1.12	$1.13	$	$	$	$ ....
75/20	.95	.96	....	.89	.90	.79
75/50	.97	.98	....	....	.92	.84
100/26-40	.91	.92	....	.85	.86	.77
120/40	.82	.83	....	.76	.77	....
150/40	.74	.75	.74	.69	.70	.66
200/52	.70	.71	....	.66	.67	....
300/80	.66	.67	....	.62	.63	.60
450/120	.66	.67	....	.62	.63	....
600/160	.65	.66	....	....	....	....
900/80-240	.63	.64	....	....	....	.61

150 Denier 12-TM Tubes ..... .73
2-Pound Cheeses ..... .01 Less Than 4-Pound Cheeses
2-BU and 4-BU Tubes ..... Same Price as 4 and 6-Lb. Cones

Terms: Net 30 days. Shipments prepaid to any destination in U.S.A.
Prices subject to change without notice.
All previous prices withdrawn.
Prices on unlisted items can be obtained upon request.
Orders are subject to conditions of sale appearing on our acknowledgements of orders.

Celaperm Filament Yarn Prices

Denier and Filaments	Intermediate Twist 4 & 6-Lb. Cones	Beams	Spinning Twist Cones	Beams
55/15	$1.37	$1.38	$1.31	$1.32
75/20	1.34	1.35	1.28	1.29
100/26	1.28	1.29	1.22	1.23
120/40	1.19	1.20	1.13	1.14
150/40	1.11	1.12	1.06	1.07
200/52	1.05	1.06	1.01	1.02
300/80	1.01	1.02	.97	.98
450/120	.99	1.00	.95	.96
600/160	.97	.98	....	....
900/80	.94	....	....	....

Celaperm Black Yarn Prices

Effective March 11, 1955

Denier and Filaments	4 & 6-Lb. Intermediate Twist Cones	Beams	Spinning Twist Cones	Beams
55/15	$1.17	$1.18	$1.11	$1.12
75/20	1.14	1.15	1.08	1.09
100/26	1.08	1.09	1.02	1.03
120/40	.99	1.00	.93	.94
150/40	.91	.92	.86	.87
200/52	.85	.86	.81	.82
300/80	.81	.82	.77	.78
450/120	.79	.80	.75	.76
600/160	.77	.78	....	....
900/80	.74	....	....	....

3 to 5 Turns on Cones or Beams — $.02 Additional

Terms: Net 30 days. Transportation prepaid or allowed to any destination in U.S.A.
Prices subject to change without notice.
All previous prices withdrawn.
Note: Prices on unlisted items can be obtained upon request.
Orders are subject to conditions of sale appearing on our Acknowledgments of Orders.

E. I. du Pont de Nemours & Co.

Textile Fibers Dept.
Current Prices

Acetate

Denier & Filament	Zero Twist Tubes	Beams	Low Twist Cones	Beams	Intermediate Twist 2 & 4 Lb. 5/8" Tbs.	4 & 6 Lb. Tw. Tbs.	Cones	Bms.
40-13	$1.06	$1.13						
45-13	.94	1.02		$1.11			$.99	$1.00
55-18	.82	.86		.91			.99	1.00
55-24	.82	.86		.91			.95	.96
75-24	.79			.90		$.93	.97	.98
75-50				.92		.95	.91	.91
100-32	.77	.85		.86		.89	.82	.83
120-50	.73	.76		.77		.81	.74	.75
150-40	.66	.69	$.69	.70	.74	.74	.69	.70
200-60/64	.65		.66	.67	.70	.70	.71	.71
240-80			.65					
300-80	.60	.62	.62	.63	.66	.66	.66	.67
450-120	.61		.62	.63	.66	.66	.66	.67
600-160					.65		.65	.66
900-44					.63		.63	.64
900-240	.61				.63		.63	.64
1800-88					.61		.61	.62
2700-132					.61		.61	.62
3000-210					.61		.61	.62

(A) Regular Twist (2.9 and 5 T.P.I.)—add $.02 to Intermediate Twist Price.
(B) 1 lb. 5/8" Tubes—add $.02 to 2 & 4 lb. 5/8" Tube Price.

Color-Sealed

Denier & Filament	Zero Twist Tubes	Beams	Low Twist Cones	Beams	Intermediate Twist Twisted Tubes 2 Lb.	4 & 6 Lb.	Cones	Beams
55-18	$1.245	$1.315		$1.32	$1.35	$1.35	$1.37	$1.38
75-24	1.18	1.28		1.29	1.32	1.32	1.34	1.35
100-32	1.14			1.23	1.26	1.26	1.28	1.29
150-40	1.03	1.06	1.06	1.07	1.10	1.11	1.11	1.12
200-64	1.00			1.02	1.04	1.05	1.05	1.06
300-80	.95	.97		.98	1.00	1.01	1.01	1.02

(A) Regular Twist—Add $.02 to Intermediate Twist Price.

Black

Denier & Filament	Zero Twist Tubes	Beams	Low Twist Cones	Beams	Intermediate Twist 2 & 4 Lb. 5/8" Tbs.	4 & 6 Lb. Tw. Tbs.	Cones	Beams
40-13	$1.215	$1.285						
55-18	1.045	1.115		$1.12		$1.15	$1.17	$1.18
75-24	.98	1.08		1.09		1.12	1.14	1.15
100-32	.94			1.03		1.06	1.08	1.09
150-40	.83	.86	.86	.87		.91	.91	.92
200-60	.80		.81	.82		.85	.85	.86
300-80	.75	.77	.77	.78	.81	.81	.81	.82
450-120				.76	.79	.79	.79	.80
600-160				.74	.77	.77	.77	.78
900-240, 44				.74	.74	.74	.74	.75

(A) Regular Twist (2.9 and 5 T.P.I.)—add $.02 to Int. Twist Price.
(B) 1 lb. 5/8" Tubes—add $.02 to 2 & 4 lb. 5/8" Tube Price.

Specialty Yarns

Type 20	Same Price as Regular Yarn
Type C	Same Price as Regular Yarn

Thick & Thin

Denier & Filament	Natural Cones	Beams	Black Cones	Beams	Color-Sealed Cones
200-64 Int. Twist	$1.05	$	$1.15	$	$1.35
200-64 Reg. Twist	1.08	1.09	1.17	1.21	....

Terms: Net 30 days. Subject to changes without notice.
Domestic Freight Terms are F.O.B. shipping point, freight prepaid our route within the continental limits of the United States, excluding Alaska.

Eastman Chemical Products, Inc.

Tennessee Eastman Co.
Effective March 13, 1959

"Estron"* Yarn, Bright or Dull — White

Denier & Filament	Regular Twist Cones	Beams	Intermediate Twist Cones	Beams	Low Twist Cones	Beams	Zero Twist Tubes	Tricot Beams Spun Twist	Zero Twist
55/13	$1.01	$1.02	$0.99	$1.00	$0.93	$0.94	$0.82	$0.87	$0.86
75/19	.97	.98	.95	.96	.89	.90	....	.90	....
75/49	.99	1.00	.97	.98	....	....	....	....	....
100/25	.93	.94	.91	.92	.85	.86	....	....	....
120/30	.84	.85	.82	.83	.76	.77	....	....	....
150/38	.76	.77	.74	.75	.69	.70	.66	....	....
200/50	.72	.73	.70	.71	.66	.67	....	....	....
300/75	.68	.69	.66	.67	.62	.63	.60	....	....
450/114	.68	.69	.66	.67	.62	.63	....	....	....
600/156	.67	.68	.65	.66	.62	.63	....	....	....
900/230	.65	.66	.63	.64	....	....	.61	....	....
Heavier	....	....	....	....	....	....	.56	....	....

Current Prices—December 19, 1955

"Chromspun"*—Standard Colors (Except Black)

Denier & Filament	Regular Twist Cones	Regular Twist Beams	Intermediate Twist Cones	Intermediate Twist Beams	Low Twist Cones	Low Twist Beams
55/13	$1.39	$1.40	$1.37	$1.38	$1.31	$1.32
75/19	1.36	1.37	1.34	1.35	1.28	1.29
100/25	1.30	1.31	1.28	1.29	1.22	1.23
150/38	....	....	1.11	1.12	1.06	1.07
300/75	....	....	1.01	1.02	.97	.98
450/114	....	....	.99	1.00	.95	.96
900/230	....	....	.94	.95	....	....

Current Prices

"Chromspun"*—Black

Denier & Filament	Regular Twist Cones	Intermediate Twist Cones	Intermediate Twist Beams	Low Twist Beams
55/13	$1.19	$1.17	$1.18	$1.12
75/19	1.16	1.14	1.15	1.09
100/25	1.10	1.08	1.09	1.03
150/38	.93	.91	.92	.87
200/50	.87	.85	.86	.82
300/75	.83	.81	.82	.78
450/114	.81	.79	.80	.76
900/230	.76	.74	.75	....

Prices are subject to change without notice.
Prices on special items quoted on request.
Terms: Net 30 days. Payment—U. S. A. dollars.
Transportation charges prepaid or allowed to destination in continental United States except Alaska. Seller reserves right to select route and method of shipment. If Buyer requests and Seller agrees to a route or method involving higher than lowest rate Buyer shall pay the excess of transportation cost and tax.
* "Estron" is a trade-mark of the Eastman Kodak Company.
* Chromspun is a trade-mark of the Eastman Kodak Company.

RAYON

American Bemberg

Current Prices

Regular Production Reel Spun Yarn

Den/Fil	No Turn Skeins	Turned* Skeins & Cones	8½ Turns	High Turn Skeins & Cones 12 Turns	15 Turns	18 Turns
40/30	$1.49	$1.95	....	....	....	$2.08
50/36	1.29	1.55	....	....	....	1.85
65/45	1.22	1.38	....	$1.61	....	1.66
76/60**	1.11	1.25	....	1.48	$1.53	1.56
100/74**	1.02	1.15	....	1.40	1.45	1.51
125/60	1.01	1.12	$1.16	1.37	....	....
150/120	.99	1.08	1.18	1.33	....	....
300/225	....	1.01	....	....	1.14	....
900/744	....	.91	....	....	....	....
1800/744	....	.91	....	....	....	....

* Turn includes twists up to 6 turns on 40 and 50 denier, and up to 5 turns on heavier deniers.
** Spun Dyed Cupracolor Black 15¢ per lb. extra.

"44" HH Spool Spun Yarn

Den/Fil	No Turn Tubes	No Turn Beams	5 Turn Beams	5 Turn Cones	12 Turn Beams	12 Turn Cones	15 Turn Cones
40/30	$1.35	$1.35	....	....	....	....	....
50/36	1.05	1.05	....	....	....	....	....
65/45	1.13	....	....	....	....	$1.50	....
75/45*	1.04	....	$1.15	$1.15	$1.38	1.38	$1.46
100/60*	.96	....	1.10	1.10	1.30	1.30	1.38
125/60	.91	....	1.06	1.06	....	....	....
150/90*	.83	....	.87	.87	1.21	1.21	1.30
150/120	.87	....	....	.99	....	....	....

* Available also in Spun Dyed Cupracolor Black at 15¢ per lb. extra.

"44" HH "Parfe" Spool Spun Yarn

Den/Fil	No Turn Cones	5 Turn Cones	5 Turn Beams	12 Turn Cones	15 Turn Cones
50/36	$1.60	$1.85	$1.85	....	....
75/45	1.48	1.58	1.58	1.78	1.88
100/60	1.38	1.48	1.48	1.68	1.78
150/90	1.21	1.28	1.28	1.63	1.73
300/120	1.21	1.28	....	....	....

Nub-Lite (Short Nubbi)

Code	Den/Fil	2½ Turn Natural Cones	2½ Turn Cones*	5 Turn Natural Cones	5 Turn Cones*
1515	160/90	....	....	$1.50	$1.40
1519**	155/90	....	....	1.50	1.40
2008	200/120	....	....	1.11	1.01
3002	315/180	$1.15	$1.05	....	....
4011	410/224	1.15	1.05	....	....
6001	600/360	1.13	1.03	....	....
8001	860/450	1.13	1.03	....	....

* Basic price for cones when dyed. Dyed Colors 30 and 35 cents above basic price. Prices based on 200 lb. dyed lots only. Prices for natural yarn skeins same as natural cone prices.
** Code 1519 can be run in warp or filling.

CUPIONI Type B

Code	Den/Fil	2½ Turn Cones
9650	70/45	$1.69
9660	100/60	1.53
1545	150/90	1.30
9730	285/135	1.15
9792	450/225	1.15
9814	600/372	1.12
9837	940/372	1.02

"Spun Dyed Cupracolor is spun 150, 285, and 940 deniers at 35¢ per pound extra. Cupracolor Black Comes in all deniers."

STRATA SLUB

Code	Den/Fil	Turned Cones	Price
9747	275/225	3½	$1.25
9798	450/372	2½	1.15
9823	600/372	2½	1.10
9847	960/372	2½	1.02
9885	1290/372	1½	1.00
9934	2680/744	1½	1.00

"Spun Dyed Cupracolor is spun in 600 and 960 deniers at 35¢ per pound extra."

FLAIKONA

Code	Den/Fil	Turned Cones	Price
9699	150/148	2½	$1.35
9769	300/224	2½	1.25
9782	450/270	2½	1.05
9809	600/360	2½	1.05
9840	900/450	2½	1.00
9924	2000/744	2½	.95

"Spun Dyed Cupracolor Black 35¢ per pound extra."
Terms: Net 30 days, F. O. B. shipping point. Minimum freight allowed to consignee's nearest freight station east of the Mississippi River. To points west of the Mississippi River minimum freight allowed to Memphis, Tennessee. Goods after shipment shall be at buyer's risk. Merchandise transported in seller's own trucks or those of its affiliates is sold F. O. B. delivery point.
Prices are subject to change without notice.

American Enka Corp.

Current Prices
Effective June 29, 1959
Standard Quality Yarns

Standard Quality Rayon Yarns

NATURAL

Den./Fil.	Luster	Turns		Weaving Cones	Weaving Beams	Skeins Long	Skeins Short	Cakes	Knitting Cones
50/18	B	5	S	....	....	....	....	....	1.63
50/20	B	4	S&Z	....	....	....	....	1.52	1.64
75/10	B	3	S&Z	....	....	....	....	1.02	....
75/18	E	4	S	....	....	....	....	....	1.14
75/30	B	4	S&Z	....	....	1.32	1.41	1.02	1.14
75/30	B	8	S	1.24	—	1.49	1.59	1.12	1.24
75/45	P,E	4,5	S&Z	....	....	1.32	1.41	1.02	1.14
75/60	B,P	3,4	Z	1.16	....	....	....	1.04	....
100/14	B	3	S&Z	....	....	....	1.23	.90	....
100/40	B,E	12	S&Z	....	....	....	....	....	1.29
100/40	B,P,E	4,5	S&Z	....	.98	....	....	.90	.98
100/40	B	6	S	1.17	....	1.34	1.44	1.09	....
100/40	B,P	2.5,4	S&Z	.98	.98	1.15	1.23	.90	....
100/60	B	4	S&Z	....	....	....	....	.90	....
100/60	E	2.5	S	1.00	1.00	....	....	.92	....
125/40	E	3	Z	....	....	....	....	.87	.90
125/50	B,P	3	S	.96	.96	....	....	....	....
150/40	B,E	0		.745	....	....	....	....	....
150/40	B,P,E	2.1,3	S&Z	.82	.82	.96	1.03	.78	.82
150/40	B,E	5	S&Z	.90	.90	1.15	1.25	.86	....
150/40	B,E	8	S&Z	.95	.95	1.20	1.30	.91	....
150/90	E	2.1	S&Z	.83	.83	....	....	.79	....
200/40	P	3	Z	....	....	.94	1.01	.77	.81
200/40	B	2.1	S	.81	.81	.94	1.01	.77	....
250/60	P,E	2.4	Z	....	....	.93	1.00	.77	.80
300/30	E	3	S	.81	.85	....	....	....	....
300/50	B,E	3	S	.73	.76	....	....	....	....
300/60,120	B,P,E	2.1	S&Z	.73	.73	.82	.89	.71	.73
300/60	B	3.5	S	.73	.73	.82	.89	.71	....
300/60	B	6	S	.86	.86	....	1.00	.84	....
300/60	B	8	S	.88	.88	....	....	.86	....
300/120H.T.	B	2.5	S	.75	.75	....	....	.73	....
300/40H.T.	B	3	Z	.85	....	....	....	.83	....
450/60	B	3	S	.69	.71	....	....	.67	....
450/80	B,E	3	S	.69	.71	.78	.85	.67	....
600/80	B,E	3	S	.73	.75	....	....	....	....
600/120	B	3	S	.69	.71	.78	.85	.67	....
900/120	B	3.4	S	.69	.71	.78	.85	.67	....
900/120H.T.	B	3.6	S	.71	.71	....	....	.69	....

B = Briglo
P = Periglo (Semi-Dull)
E = Englo (Dull)
H.T. = High Tenacity

Jetspun® (Colored Yarns)

Den./Fil.	Tenacity	Turns	Weaving Cones	Weaving Beams	Colors
100/40	Regular	2.5S	$1.35	$1.35	All
150/40	Regular	2.1S	1.17	1.17	All
200/40	Regular	8.3S	1.28	1.28	All
300/40	Regular	3.4S	1.09	1.09	All
300/120	Regular	2.1S	1.09	1.09	All
450/80	Regular	3.0S	1.05	1.05	All
600/80	Regular	3.4S	1.04	1.04	All
300/40	High	3.4S	1.11	1.11	All
600/80	High	3.4S	1.07	1.07	All
900/120	High	3.4S	1.06	1.06	All

® Registered Trade Mark for American Enka Solution-dyed Rayon Yarn.

Skyloft (Lofted Rayon Filament Yarns) Natural and Jetspun®

Denier	Denier per Filament	Twist	Cones or Tubes Natural	Cones or Tubes Black	Cones or Tubes Other Colors
1000	7.5	3.5S	$.92	$1.17	$1.17
2200	15	3.5S&Z	.67	.77	.84
2700	15	3.5S&Z	.67	.77	.84
4300	15	3.0S&Z	.66	.76	.83
5300	15	3.0S&Z	.65	.75	.82

American Viscose Corp.

Effective October 13, 1959

Graded Yarns

Denier	Filament	Type	Short Skeins	Long Skeins	Cones Tubes	Beams Spools	Cakes
		Regular Turns					
75	10-30	Bright	$1.41	$1.32	$1.14	$1.14	$1.02
75	30	Dull	....	....	1.14	1.14	1.02
100	14-40	Bright	1.23	1.15	.98	.98	.90
100	60	Dull	....	....	1.00	1.00	.92
150	24-40	Bright	1.03	.96	.82	.82	.78
150	40	Semi-Dull	1.03	.96	.82	.82	.78

News (Continued from Page 58)

Laundering Dictionary

"Home Laundering Terms" is a dictionary of terms approved by the members of the American Laundry Manufacturers' Association, home economists and allied laundry aid manufacturers. Copies are 10 cents each, and may be obtained by writing the Association at 20 N. Wacker Dr., Chicago 6, Ill.

Carbic-Hoechst Moves

Carbic-Hoechst Corp., New York City, has relocated its New England office and Pigment Division at 129 Quidnick St., West Warwick, R. I., where Hoechst Chemical Corp. is located. The New England office and division formerly was located in Providence, R. I.

Loop-Pile Rug Promotion

"Captivation," a new loop-pile carpet created by Callaway Mills from Allied Chemical's textured Caprolan filament nylon, is featured in promotions by carpet retailers in various cities. It is the first loop-pile carpet to be awarded Allied Chemical's "Certificate for Performance" label.

Personnel Notes

Robert E. Droney has been appointed product manager for Lurex metallic yarns at the Dow Chemical Co., succeeding **Heber E. Allen,** retired. **W. Hampton Oliver** has been appointed to represent the company's textile fibers department in the Detroit automotive market.

Richard H. Powers has been appointed assistant general sales manager for Celanese Fibers Co. Further appointments in the company's sales staff include: **Randolph J. Jewell,** manager of sales development; **L. G. Lovin, Jr.,** manager of Acetate and Arnel Filament Yarns; **C. R. Blossom,** manager of Rayon and Fortisan Filament Yarns; **T. R. Brown,** assistant manager of Staple Fiber and Tow sales; and **Quinton Florence,** sales manager for southern district sales.

Donald M. Joseph has been appointed vice president and general manager of Ciba Products Corp. At Ciba Co., Inc. the following appointments have been made: **C. O. Stevenson,** sales manager of the southern district; **George Anderson,** sales representative in the Georgia territory; **John Clark,** sales representative in South Carolina. **Neely McFadden Hollis** and

(Continued on Page 65)

150	40	Dull	....	....	.82	.82	.78
150	90	Dull	....	....	.83	....	.79
200	10-44	Bright	1.01	.94	.81	.81	.77
250	60	Semi-Dull & Dull	1.00	.93	.80	.80	.77
300	15	Bright	....	.85	.78	.78	....
300	30	Dull Flat Filament	....	....	....	.85	....
300	44	Bright & Dull	.89	.82	.73	.73	.71
300	234	Dull	....	....	.83	....	.81
450	60-100	Bright	....	.78	.69	.71	.67
600	100	Bright & Dull	....	.78	.69	.71	.67
900	50-100-150	Bright	....	.78	.69	.71	.67
1200	75	Bright	....	.78	.69	.71	....
2700	150	Bright	....	.78	.69	.71	....

Extra Turns Per Inch

150	40	Bright	6-Turns	$1.25	$1.15	$ .90	$ .90	$ .88
200	44	Bright	6-Turns	....	1.05	.96	.96	....
300	15	Bright	5-Turns	....	....	.86	.86	....
300	44	Bright	4.3-Turns	....	....	.81	....	.79
300	44	Bright	6-Turns	.97	.90	.86	.86	.84
300	120	Rayflex	6-Turns	....	....	.93	.93	....
600	30	Bright	5-Turns	....	.86	.82	.82	.80

Rayflex Yarns

150	40-60	Rayflex	$	$	$ .85	$ .85	$ .81
200	75	Rayflex	....	....	.84	.84	.80
300	60-120	Rayflex	....	....	.75	.75	.73
450	120	Rayflex	....	....	.71	.71	.69
600	234	Rayflex	....	....	.71	.71	.69
900	350	Rayflex	....	.80	.71	.71	.69

Thick & Thin Yarns

150	40-90	Bright & Dull	$	$	$1.18	$	$ ....
200	75	Bright & Dull	....	....	1.06	....	....
300	120	Bright & Dull	....	....	.98	....	....
450	100	Bright & Dull	....	....	.92	....	....
490	120	Bright & Dull	....	....	.98	....	....
900	350	Dull	....	....	1.03	....	....
920	120	Bright & Dull	....	....	1.03	....	....

Colorspun Yarns

Denier	Type	Cones/Tubes Beams/Spools
75	Regular Strength	$1.71
100	Regular Strength	1.35
150	Regular Strength	1.17
200	Regular Strength	1.14
300	Regular Strength	1.09
450	Regular Strength	1.05
600	Regular Strength	1.05
900	Regular Strength	1.05
300	High Strength	1.11
450	High Strength	1.06
900	High Strength	1.06
300	Regular Strength 5-Turns	1.19

Avicron Yarns

Avicron Yarns

Denier	Filament		Cones/Tubes Beams/Spools
1800	100-200	Singles & 2 Ply	$.68
2700	150-300-980	Singles & 2 Ply	.65

Viscose Filament Yarns

The following material deposit charges are required:

Metal Section Beams	$170.00 each
Metal Section Beam Racks	75.00 each
Metal Tricot Spools—14" flange	30.00 each
21" flange	60.00 each
32" flange	150.00 each
Metal Tricot Spool Racks—14" flange	135.00 each
21" flange	100.00 each
32" flange	75.00 each
Wooden Tricot Spool Crates	20.00 each
Cloth Cake Covers	.05 each

Same to be credited upon return in good condition—freight collect.

Celanese Corp. of America

Current Prices

Effective June 24

Viscose Rayon Filament Yarn Prices—Bright and Dull

Denier/Fil/Twist		Beams	Cones	Cakes
75/30/3			1.10	.98
100/40/2Z		.97		
100/40/3			.96	.88
100/40/5			1.02	
100/60/2Z	NS		.96	
100/60/3			.98	.90
125/40/2Z		.93		
125/40/3			.94	.85
150/40/0	NS		.74½	
150/40/2Z		.81		
150/40/3			.79½	.76
150/40/5			.90	.86
150/40/8			.95	.91
150/90/0	NS		.77½	
250/60/0	NS		.74	
250/60/3			.80	.77
300/50/0	NS		.70	
300/50/2Z		.72		
300/50/3			.70½	.69
450/120/0	NS		.67	

Terms: Net 30 days. Transportation prepaid or allowed to any destination in U. S. A.

Prices subject to change without notice.

All previous prices withdrawn.

Prices on unlisted items can be obtained upon request.

Orders are subject to conditions of sale appearing on our acknowledgments of orders.

E. I. du Pont de Nemours & Co.

Textile Fibers Dept. Current Prices

Effective with orders June 24, 1959

Bright and Dull

Den.	Fil.	Turns/Inch Up to		Beams	Cones (A) Tubes	Cakes
40	20	3	Textile "Cordura"•		$1.97	$1.92
50	20	3			1.70	
50	20	3	Textile "Cordura"		1.72	1.67
50	35	3	Textile "Cordura"		1.77	
75	10	3	Bright			1.02
75	30	3		$1.14	1.14	1.02
100	40	3	Bright	.98	.98	.90
100	60	3	Dull		1.00	.92
125	50	3		.96	.96	.87
150	40	3		.82	.82	.78
150	60	3	Bright	.82	.82	.78
150	60	3	Textile "Cordura"		.875	.845
150	90	3	Dull		.83	
150	100	3	Dull		.83	
300	50	2.5		.73	.73	.71
300	120	3	Textile "Cordura"	.74	.74	.72
450	72	3		.71	.69	.67
600	96	3	Bright	.71	.69	.67
600	240	3	Textile "Cordura"	.72	.70	
900	50	3	Bright	.71	.69	.67
900	144	3	Bright	.71	.69	.67
1165	480	3	Textile "Cordura"	.72	.70	.68
1800	100	3	Bright		.69	
2700	150	3	Bright	.71	.69	

Thick and Thin

100	40	3	#7 Bright		1.42	
150	90	3	#7 Bright		1.08	
200	80	3	#7 Bright		1.08	
450	100	3	#7 Bright		.92	
1100	240	3	#60 Bright		1.03	
2200	480	3	#60 Bright		.98	

Monofils

150	1	3	Bright	1.35	1.35	
300	1	3	Bright	1.15	1.10	
600	1	3	Bright		1.00	

Plush

300	30	3	Dull	.85	.81	

(A) 2¢/lb. additional for cones less than 3#.

Terms: Net 30 days.

Domestic Freight Terms are F.O.B. shipping point, freight prepaid our route within the continental limits of the United States, excluding Alaska.

• "CORDURA" and "SUPER CORDURA" are Du Pont's registered trade-marks for its high tenacity rayon yarn.

Industrial Rayon Corp.

Effective June 29, 1959

Continuous Process Textile Yarns

Denier	Filament	Turns per In.	Type	Beams	2.8# Cones	4.4# Cones and Tubes
150	40	2.5"S"	Bright	.82	.82	
200	20	2.5"S"	Bright	.81	.81	
300	44	2.5"S"	Bright	.73	.73	
450	60	2.0"S"	Bright	.69		.69
600	90	1.5"S"	Bright	.69		.69
900	50	2.0"S"	Bright	.69		.69
900	150	2.0"S"	Bright	.69		.69
1100	480	2.0"Z"	Bright extra strong	.66		.66

Lustre #4 is semi-dull.

Prices are subject to change without notice.

Strawn Monofilament

Denier	Filament	Turns per In.	Type	4.4# Cones	Spools and Tubes
450	1	0	Bright and Dull	1.00	1.05
450	1	2	Bright and Dull	1.00	1.05
1250	1	0	Bright and Dull	1.00	1.05
1250	1	2	Bright and Dull	1.00	1.05

Terms: Net 30 days f.o.b. point of shipment; title to pass to buyer on delivery of goods to carrier. Domestic transportation charges prepaid with transportation allowed at lowest published rate to all points in continental United States except Alaska.

Prices are subject to change without notice.

North American Rayon Corp.

Current Prices

Prices Effective July 3, 1959

Denier/Filament	Twist	Knitting* Cones	No Twist Knitting Cones	Weaving Cones, Velvet Cones, Beams, Tubes**	Untreated Cakes
Normal Strength Yarns — NARCO					
75/30	3.5			1.14	1.02
75/30	7			1.27	
75/30	12			1.35	
75/30	15			1.37	
75/30	20			1.40	
100/40/60	3.5			.98	.90
100/40	12			1.22	
125/25/60	3			.96	.87

150/42	0		.74½		
150/42/60	3	.80½		.82	.78
300/75	0		.71		
300/75	3	.73		.73	.71
900/46	2.5	.69		.69	
1800/92	2.5	.69		.69	

* Oiled Cones $.01 per pound extra for Graded Yarns only.
** 1 lb. Tubes $.02 per pound extra for Graded Yarns only.

Terms: Net 30 days, F.O.B. shipping point, minimum freight allowed to consignee's nearest freight station east of the Mississippi River. To points west of the Mississippi River minimum freight to Memphis, Tennessee allowed. Goods after shipment shall be at buyer's risk. Merchandise transported in seller's own trucks or those of its affiliates is sold F.O.B. delivery point.

Prices subject to change without notice.

TRIACETATE

Celanese Corp. of America

Current Prices

Arnel Yarn Prices
Bright & Dull

Effective August 19, 1958

Denier and Filaments	Cones	Beams	Thick and Thin Cones
55/WKZ/15	$	$1.16	$ ....
55/2Z/15	1.32	1.33	....
75/WKZ/20	....	1.16	....
75/2Z/20	1.21	1.22	....
100/2Z/26	1.14	1.15	....
150/2Z/40	.95	.96	....
200/2Z/40	....	....	....
200/2Z/52	.92	.93	1.25
300/2Z/80	.87	.88	1.23
450/2Z/120	.86	.87	....
600/2Z/160	.85	.86	1.21

3 to 5 Turns on Cones or Beams—$.02 Additional
Premium for Black Arnel—$.25 Per Pound
Premium for Navy Arnel—$.37 Per Pound

Terms: Net 30 days. Transportation prepaid or allowed to any destination in U.S.A.

Prices subject to change without notice.

All previous prices withdrawn.

Note: Prices on unlisted items can be obtained upon request.

Orders are subject to conditions of sale appearing on our Acknowledgments of Orders.

CELLULOSIC HIGH TENACITY YARN and FABRIC

American Enka Corp.

Effective December 19, 1958

Tempra (High Tenacity)

Denier	Elongation	Beams & Cones
1100/480	Low	.60
1230/480	High	.60
1650/720	Low	.53
1820/720	High	.53
2200/960	High & Low	.52

Enka II

*1100/720	Low	.62
*1650/1100	Low	.55
2200/1440	Low & High	.54

Terms: Net 30 days, f.o.b. Enka, North Carolina; or Lowland, Tennessee; minimum freight allowed to first destination east of the Mississippi River. * Tyrex certified viscose yarn.

American Viscose Corp.

Effective Dec. 23, 1959

Tyrex*
Tyrex* Viscose Tire Yarn

Denier	Filament	Twist	Beams	Cones
1100	980	0	.57	.57
1100	980	Z	.57	....
1650	1500	0	.50	.50
1650	1500	Z	.50	....

Tire Fabric Made with Tyrex* Viscose Tire Yarn and Cord

Denier	Filament	Carcass	Top Ply	Breaker
1100	980/2	.69	.69	.69
		Factor Open-525	300-490	115-275
1650	1500/2	.59	.60	.625

Factor determined by dividing total ends by picks.

* Tyrex is a collective trade-mark of Tyrex Inc. for Viscose Tire Yarn and Cord.

Rayon Tire Yarn
Yarn

Denier	Filament	Twist	High Strength (Unslashed)	High Strength	Super "Rayflex" 210-310	Super "Rayflex" 120-220-320
1100	490	0-Z	....	.56	....	....
1100	980	0-Z	....	....	....	.57
1150	490	Z	.56	....	....	....
1230	490	Z	.56	....	....	....
1650	980	Z	.49	.49	.49	....
1650	980	0	....	.49	....	....
1650	1500	Z	....	....	....	.50
1650	1500	0	....	....	....	.50
1875	980	Z	.49	....	.49	.50
2200	980	0	....	.48	....	....
2200	1500	0	....	....	....	.49
3300	3000	0	....	....	....	.49
4400	3000	0	....	....	....	.49

High Strength available on cones—tubes—beams.

High Strength and Super "Rayflex"

0 Twist—available on 10# cones—beams—10# tubes.
Z Twist—available on beams.

Avisco Bag Twine

Sold by The American Thread Company

1100/980	Super "Rayflex"	0-Z	Cones	.62
1500/980	Super "Rayflex"	0-Z	Cones	.59
1780/980	Super "Rayflex"	0-Z	Cones	.55

Also available in red at .07 premium.

Chafer Yarn

1100/490 High Strength	5Z	Twist	.60

All yarns sold "Not Guaranteed for Dyeing".

Tire Fabric

Denier	Filament	Type	Carcass	Top Ply	Breaker
1100	980	Super 120-220-320	.69	.69	.69
		Factor*	Open-525	300-490	115-275
1650	980	Super 110-210-310	.58	.59	.615
1650	1500	Super 120-220-320	.59	.60	.625

* Factor determined by dividing total ends by picks.

Cord on cones in regular Tire Yarn twists same as fabric prices.

Other twist combinations—prices quoted on request.

When supplied, yarns and cords in special packages take premiums indicated.

10.5 oz Wardwell Tubes	.10
1.5 lb Regular Braider Tubes	.06
3.5 lb Tubes	.045

The following deposit charges are made on invoices:

Beams	$55.00 each
Crates (Metal)	75.00 each
Fabric Shell Rolls	3.50 each

Same to be credited upon return in good condition—freight collect.

Rayon Tire Yarn and Fabric

Terms: Net 30 days. Seller to select and to pay transportation charges of common and contract carrier except when shipment moves West of the Mississippi River, in which event the actual cost of transportation to the Mississippi River crossing based on the lowest published freight rate, shall be allowed. Title to pass when merchandise is delivered to consignee. Transportation allowance based on lowest published volume rate shall be granted if merchandise is transported from shipping point in vehicle owned or leased and operated by buyer and title to pass when merchandise is delivered to same.

Price subject to change without notice.

Celanese Corporation of America

Effective December 27, 1955

Fortisan Yarn Prices

Denier	Packages	Natural	Black
30/2.5/40	2 lb. Cones	$3.00 lb.	$3.35 lb.
60/2.5/80	4 " "	2.40 "	2.75 "
90/2.5/120	4 " "	2.25 "	2.60 "
120/2.5/160	4 " "	2.05 "	2.40 "
150/2.5/180	4 " "	1.95 "	2.30 "
270/2.5/360	4 " "	1.85 "	2.20 "
300/2.5/360	4 " "	1.85 "	2.20 "
60/2.5/80 Olive Green—Spun Dyed—OG106		4 lb. Cones	3.50 lb.

Terms: Net 30 days. Shipments prepaid to any destination in U.S.A.

Prices subject to change without notice.

All previous prices withdrawn.

Prices on unlisted items can be obtained upon request.

Orders are subject to conditions of sale appearing on our acknowledgments of orders.

Fortisan-36 Rayon Yarn
Bright

Denier and Filament	Twist	4# cones	8# cones	Tubes	Beams
270/280	0.8Z	$2.30			
300/280	0.8Z	$2.05			
300/280	3Z	$2.20			
400/400	0.8Z	$1.75			$1.70
400/400	0			$1.75	
800/800	0.8Z	$1.25	$1.25		$1.20
800/800	3Z	$1.40			
800/800	0			$1.25	
1600/1600	0.8Z	$1.15	$1.15		$1.10
1600/1600	2½Z	$1.30			
1600/1600	0			$1.15	

Terms: Net 30 days. Shipments prepaid to any destination in U.S.A.

Prices subject to change without notice.

All previous prices withdrawn.

Prices on unlisted items can be obtained upon request.

Orders are subject to conditions of sale appearing on our acknowledgments of orders.

E. I. du Pont de Nemours & Co.

Textile Fibers Dept. Current Prices

Effective December 23, 1959

"Super Cordura"*

Den Fil	Turns/in	All Packages
1100-720	2	.57
1200-720	2	.57
1530-960	2	.59
1600-960	2	.52
1650-1100	2	.50
1800-1100	2	.50
2200-1440	2	.49
2400-1440	2	.49

Terms: Net 30 Days.

Domestic Freight Terms are F.O.B. shipping point, freight prepaid our route within the continental limits of the United States, excluding Alaska.

* "CORDURA" and "SUPER CORDURA" are DuPont's registered trade-marks for its high tenacity rayon yarn.

Industrial Rayon Corporation

Effective September 21, 1959

Unbleached Bright High Tenacity Yarns

Single End Beams and Cones—Type 100

Denier	Filament	Turns per Inch	Beams	Cones
1100	480	2.0 "Z"	.56	.56
1150	480	2.0 "Z"	.56	.56
1650	720	2.0 "Z"	.49	.49
1725	720	2.0 "Z"	.49	.49
2200	1000	2.0 "Z"	.48	.48
3300	1440	2.0 "Z"	.48	.48
4400	2000	2.0 "Z"	.48	.48

News (Continued from Page 61)

J. C. Whitt have joined the sales and technical service staff in Chicago.

Norman C. Casey has been appointed merchandising manager for home furnishings at Courtaulds (Alabama) Inc.

Wilbur H. Brumfield has been appointed president of Allied Chemical Corp.'s Solvay Process Division and **Frank J. French** president of the company's General Chemical Division. In the same company **Frank M. Norton** has been made executive vice president of the Plastics and Coal Chemical Division and in the National Aniline Division, **Dr. Harry H. Weinstock, Jr.,** has been appointed to the position of coordinator of Polyamide research and development activities related to Caprolan.

Mrs. Nancy Jo Kaller has joined the Merchandising Department of American Enka Corp. as retail merchandising specialist.

M. P. Gooden has been named assistant chief engineer of the Fibers Division of American Viscose Corp. In the Fibers Division Technical Department **Isaac P. Davis** has been named administrative manager and **Joseph H. Anderer** has become manager of the Applications Research and Development Section.

G. G. Whytlaw

Graeme G. Whytlaw has been named director of textile development for AviSun Corp., an equally owned affiliate of American Viscose Corp. and the Sun Oil Co.

Richard M. Salisbury has joined Hartford Fibres Co., as southern district sales manager and **William A. Lord,** as assistant plant manager at Rocky Hill, Conn.

George E. Salke has been appointed sales representative of the Finished Products Division of Indian Head Mills, Inc.

Frank G. Woods has been named manager of the Traffic Coordinating Department at Interchemical Corp., succeeding **James F. Moran,** retired.

Continued on Page 67)

Tyrex

Tyrex Certified Viscose Tire Yarn

Denier	Filament	Twist	Beams	Cones
1100	720	Z	.57	.57
1650	1100	Z	.50	.50

Terms: Net 30 days f.o.b. point of shipment, title to pass to buyer on delivery of goods to carrier. Domestic transportation charges allowed at lowest published rate to all points in continental United States except Alaska.
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

North American Rayon Corporation

Effective December 23, 1959

Super Super High Strength

Continuous Yarn Type 710		Cones	Beams
1100/720	1.6Z	.57	.57
1650/720	2.0Z	.50	.50

Tire Cord Fabrics

Super Super High Strength Type 710	Rolls
1100/720	.69
1650/720	.59

Terms: Net 30 days, f.o.b. shipping point. Minimum freight allowed to consignee's nearest freight station East of the Mississippi River. To points West of the Mississippi River minimum freight to Memphis, Tenn. allowed. Goods after shipment shall be at buyer's risk. Merchandise transported in seller's own trucks or those of its affiliates is sold f.o.b. delivery point.
Prices are subject to change without notice.

CELLULOSIC STAPLE & TOW

ACETATE

Celanese Corp. of America

Current Prices Effective March 2, 1959

Staple

(Most Deniers Available in Bright or Dull Luster)

Celanese Acetate Staple	
3, 5.5 & 8 Denier (Regular Crimp, Type HC, Type D)	$.36
2, 12 & 17 Denier (Regular Crimp, Type HC, Type D)	.37
35 Denier	.38
50 Denier	.40
Type F—5.5 & 8 Denier	.35
Type F—12 & 17 Denier	.36
Type K—(Available under Celanese License Agreement)	.39
⅝" to ⅞" length (All Deniers)	.03 (Premium)
35 Denier Flat Filament Acetate	.40
Non-Textile Acetate Fibers	.29*

Tow (Celatow)

3, 5.5 & 8 Denier	$.37
2, 12 & 17 Denier	.38
35 Denier	.40
35 Denier Flat Filament Acetate Tow	.42
50 Denier	.42

Terms: Net 30 days. Transportation prepaid or allowed to any destination in U.S.A. east of Mississippi River. Transportation prepaid to any U.S.A. destination west of Mississippi River, but charge is made for the portion of transportation from river crossing nearest customer's location.
Prices subject to change without notice.
All previous prices withdrawn.
* No transportation allowed (F.O.B. shipping point.)
Note: Prices on unlisted items can be obtained upon request.
Orders are subject to conditions of sale appearing on our acknowledgments of orders.

CROSS-LINKED

Courtaulds (Alabama) Inc.

Effective April 14, 1959

Corval™

Man-made, cross-linked, cellulosic staple, Bright and Dull, 1½, 3 and 5½ denier..... $.40 per lb.

Topel®

Man-made, cross-linked, cellulosic staple, Bright and Dull, 1½, 3 and 5½ denier..... $.37 per lb.
Terms: Net 30 days f.o.b. LeMoyne, Alabama; Minimum transportation allowed to points in U.S.A. east of Mississippi River.

POLYNOSIC

Hartford Fibres Co.

Effective August 14, 1959

"Zantrel"

Man-made, polynosic, cellulosic staple.

Semi-Bright, 1 denier, 1 9/16"	$.50 per lb.
1½ denier, 1¼" and 1 9/16"	.47 per lb.
3 denier, 1 9/16" and 2"	.47 per lb.

Terms: Net 30 days. Prices are quoted f.o.b. shipping point, lowest cost of transportation allowed, or prepaid. To points West of the Mississippi, lowest cost of transportation allowed to the Mississippi River crossing.

RAYON

American Viscose Corp. Current Prices

Rayon Staple

	Bright and Dull
Regular	$ .33
"Viscose 22"	.33
Extra Strength 1.0 Denier	.36
"Avisco XL" 1.0 Denier	.42
1.5 & 3.0 Deniers	.39
"Avisco Crimped" 1.25 Denier	.36
3.0 & 5.5 Deniers	.34
8.0 & 15.0 Deniers	.35
"Avisco Super L" 8.0, 15.0 & 22.0 Deniers	.36

COLORSPUN STAPLE

1.5 Denier 1 9/16"

Color	Code	Price
Sea Foam	517	47¢
Spun Gold	614	47¢
Cascade	419	42¢
Silver Gray	208	42¢
Bridal Rose	710	42¢
Rosewood	835	47¢
Bisque	803	42¢
Champagne	833	42¢
Sandalwood	802	42¢
3.0 Denier 2"		
Mint Green	505	47¢
Pale Pink	708	42¢
Bisque	803	42¢
Sandalwood	802	42¢
Gold	603	47¢
Turquoise	408	42¢
Wine	304	59¢
Gray	208	42¢
Spice Brown	800	47¢

Rayon Tow

Grouped Continuous Filaments (200,000 Total Denier)

1.5, 3.0 & 5.5 Denier Per Filament	.35
9.0 Denier Per Filament	.37

Terms: Net 30 days.

American Enka Corp.

Current Prices Effective 7/1/59

Rayon Staple

Regular Crimp

	Brt.	Dull
1.5 and 3 denier	$ .33	$ .33

High Crimp

6.5 denier	.34	.34
8 denier	.35	....
15 denier	.35	.35

Celanese Corp. of America

Current Prices
Effective May 1, 1959

Rayon Tow

	Bright & Dull
1.5, 3, 5.5 D.P.F. Total denier 200,000	.35
8 D.P.F. Total denier 207,000	.37

Terms: Net 30 days. Transportation prepaid or allowed to any destination in U.S.A. East of Mississippi River. Transportation prepaid to any U.S.A. destination West of Mississippi River, but charge is made for the portion of transportation from river crossing nearest customer's location.
Prices subject to change without notice.
All previous prices withdrawn.
Note: Prices on unlisted items can be obtained upon request.
Orders are subject to conditions of sale appearing on our Acknowledgments of Orders.

Courtaulds (Alabama) Inc.

Effective April 14, 1959

Rayon Staple

	Bright	Dull
1½ and 3 denier	$.33	$.33
Available in 1½", 1-9/16" and 2".		

Crimped Rayon Staple

3 and 5½ denier	$.34	$.34
Available in 1-9/16" and 3".		
3 denier		.34
Available in 2".		

Coloray® Solution Dyed Rayon Staple

Color	Price per lb.
Black	39¢
Silver Grey	41¢
Mocha	41¢
Tan	41¢
Medium Brown	41¢
Aqua	42¢
Rose	42¢
Dawn Pink	42¢
Ecru	42¢
Dark Brown	42¢
Slate Grey	45¢
Sulphur	46¢
Nugget	46¢
Light Blue	46¢
Crystal Blue	47¢
Apple Green	47¢
Sage	47¢
Peacock Blue	48¢
Medium Blue	50¢
Indian Yellow	51¢
Dark Blue	51¢
Hunter Green	51¢
Turquoise	52¢
Malachite Green	53¢
Red	58¢

In addition to the above, Black is also available in:

1½ den. 1⅛"	5½ den. 3"
3 den. 1⅛"	5½ den. 6"
3 den. 1-9/16"	

Terms: Net 30 days f.o.b. LeMoyne, Alabama: Minimum transportation allowed to points in U.S.A. east of Mississippi River.

News (Continued from Page 65)

David D. Dillion, Jr. has been appointed sales manager of the Mission Valley Fabrics Department of Iselin-Jefferson Co., Inc.

Ralph S. Cox has been appointed supervisor of parts sales for Leesona Corp., succeeding **Thomas F. Curran,** retired.

Thomas R. Brady has joined the business development department staff of Mill Factors Corp. He will represent the company in the New York-New England area.

Garret J. Garretson, II, vice president of Turner Halsey Co. has been elected chairman of the Textile Section of the New York Board of Trade, Inc. **William H. Dribben,** assistant vice president of Cone Mills, Inc. and **John Bendheim,** vice president of M. Lowenstein & Sons, Inc. have been re-elected to their former posts as vice chairman and treasurer respectively.

Dr. Melvin Hochberg has been elected a director of Nopco Chemical Co.

Norman Gordon has been appointed to the sales staff of Onyx Oil & Chemical Co. and has been assigned to the Missouri, Kentucky, Kansas, Arkansas and Oklahoma territories.

Oscar Payne

Oscar Payne, vice president of manufacturing for Crompton & Knowles Corp. has retired from his position with the company.

J. L. Wyman has been named southern sales manager for Putnam Chemical Corp. In the same company **L. E. Therrien** has been named technical sales representative for South Carolina and **J. B. Young,** southern technical service representative.

Stephen P. Sayewich, sales engineer for the Brinton Division of Scott & Williams, Inc. has been transferred to the company's New York sales office to cover the New York-New England area.

George P. Burns has been elected vice president and sales manager for machine tools at the Van Norman Machine Co.

The Hartford Fibres Co.

Div. Bigelow-Sanford Carpet Co., Inc.

Rayon Staple

Effective November 3, 1958

REGULAR

1.5 denier Bright	
1 9/16", 2"	.33
VISCALON 66 (Crimped)	
8 denier 3" Bright	.35
15 denier 3" Bright	.35
15 denier 3" Dull	.35

"KOLORBON"—Solution Dyed Rayon Staple—3" and 6"

	8 Denier Bright	15 Denier Dull	15 Denier Bright
Cloud Grey	.46	.46	....
Sandalwood	.46	.46	....
Nutria	.46	.46	....
Sea Green	.46	.46	....
Mint Green	.46	.46	....
Champagne	.46	.46	....
Midnight Black	.46	....	.46
Gold	.49	.49	....
Turquoise	.46	.46	....
Melon	.49	.49	....
Capri Blue	.46	.46	....
Charcoal Grey	.46	.46	....
Coco	.47	.47	....
Sable	.48	....	.48
Tangerine	.66	....	.66
Chinese Red	.66	....	.66
Larkspur Blue	.46	.46	....
Royal Blue	.66	....	.66
Lemon Peel	.55	.55	....
Kelly Green	.52	.52	....
Bitter Green	.66	....	.66

Terms: Net 30 days. Prices are quoted f.o.b. shipping point, lowest cost of transportation allowed, or prepaid. To points West of the Mississippi, lowest cost of transportation allowed to the Mississippi River crossing.

North American Rayon Corporation

Current Prices Effective Dec. 23, 1959

Rayon Staple

Super High Tenacity	Bright
No. 1 (Unshrunk)	
1, 1.5 & 3 deniers	.40
No. 2 (Preshrunk)	
1, 1.5 & 3 deniers	.40

Rayon Tow

High Tenacity	
2200 denier, 1.0 and 1.5 D/F	57.5
4400 denier, 1.0 and 1.5 D/F	47.5

Prices are subject to change without notice.

TRIACETATE

Celanese Corp. of America

Current Prices Effective June 7, 1957

(Most Deniers Available in Bright or Dull Luster)

Arnel Staple and Tow

	Bright & Dull
Arnel Triacetate Staple	
2.5 Individual Denier	$.55
5.0 Individual Denier	.55
Arnel Triacetate Tow	
2.5 Individual Denier 114,000 Total Denier	$.60
5.0 Individual Denier 90,000 Total Denier or 180,000 Total Denier	.60

Packaged on Ball Warps

Terms: Net 30 days. Transportation prepaid or allowed to any destination in U.S.A. east of Mississippi River. Transportation prepaid to any U.S.A. destination west of Mississippi River, but charge is made for the portion of transportation from river crossing nearest customer's location.

Prices subject to change without notice.

All previous prices withdrawn.

Note: Prices on unlisted items can be obtained upon request.

Orders are subject to conditions of sale appearing on our acknowledgments of orders.

NON CELLULOSIC YARN

NYLON

Allied Chemical Corporation

Caprolan®

Effective December 23, 1959

Denier	Filament	Turn/In.	Twist	Type**	Package	1st Grade Price/Lb.
200	16	1½	Z	B	Cone*	$1.49
200	16	1½	Z	B	Beams	1.54
200	32	¾	Z	B	Bobbins	1.49
200	32	¾	Z	B	Beams	1.54
520	32	1	Z	B	Bobbins	1.39
520	32	1	Z	B	Beams	1.44
840	136	½	Z	HBT	Al. Tubes	.97
840	136	½	Z	HBT	Beams	.97
1680	272	½	Z	HBT	Al. Tubes	.94
1680	272	½	Z	HBT	Beams	.94
1050	56	½	Z	HB	Al. Tubes	1.15
2100	112	½	Z	HB	Al. Tubes	1.11
4200	224	0	O	HB	Paper Tubes*	1.10
2100	408	0	O	HB	Paper Tubes*	.99
2500	408	0	O	HB	Paper Tubes*	.99
3360	544	0	O	HB	Paper Tubes*	.98
4200	680	0	O	HB	Paper Tubes*	.98
5000	816	0	O	HB	Paper Tubes*	.98
5800	952	0	O	HB	Paper Tubes*	.98
7500	1224	0	O	HB	Paper Tubes*	.97
10000	1632	0	O	HB	Paper Tubes*	.97
15000	2448	0	O	HB	Paper Tubes*	.97

Terms—Net 30 days.
Price subject to change without notice.
Bobbins are invoiced at 45¢ ea.
Aluminum Tubes are invoiced at 40¢ ea.
Beams are invoiced at $220.00.
Cradles for beams are invoiced at $53.00.
* Paper Tubes and Cones non-returnable, no charge.
** Type is used to describe luster and tenacity.
All prices quoted F.O.B. Shipping Point.
Minimum transportation charges allowed and prepaid in Continental United States, excluding Alaska.

B—Bright
H—High Tenacity
T—Heat Stabilized

American Enka Corporation

Enka Nylon Yarn Prices

Effective January 1, 1960

Den./Fil.	Luster*	Twist	Package	Price Per Pound Standard	Price Per Pound Sub-Standard
15/1	SD or D	0.5 Z	Tricot Spools	4.00	....
15/1	SD or D	0.5 Z	Pirns-2 lb.	3.89	3.69
20/1	SD	0.5 Z	Pirns-1 lb.	4.95	4.50
20/4-6	D	0.5 Z	Pirns-2 lb.	2.96	2.61
20/4-6	D	0.5 Z	Tricot Spools	3.07	....
30/6	SD	0.5 Z	Pirns-2 lb.	2.36	2.21
40/8	SD	0.5 Z	Pirns-2 lb.	2.01	1.91
40/8	SD	0.5 Z	Tricot Spools	2.11	....
40/8	SD-IC	0.5 Z	Pirns-2 lb.	2.10	2.00
40/10	D	0.5 Z	Pirns-2 lb.	2.06	1.96
40/10	D	0.5 Z	Tricot Spools	2.16	....
50/13	SD	0.5 Z	Pirns-2 lb.	1.91	1.76
50/13	SD-IC	0.5 Z	Pirns-2 lb.	2.00	1.85
70/32	B-SD	0.5 Z	Pirns-2 lb.	1.71	1.66
70/32	SD-IC	0.5 Z	Pirns-2 lb.	1.80	1.75
100/32	SD-IC	0.5 Z	Pirns-2 lb.	1.74	1.69
100/32	SD	0.5 Z	Pirns-2 lb.	1.65	1.60
140/64-32	B-SD	0.5 Z	Pirns-2 lb.	1.60	1.55
140/64-32	B-SD	0.5 Z	Tricot Spools	1.70	....
140/32-64	SD-IC	0.5 Z	Pirns-2 lb.	1.69	1.64
200/16-34	B	0.6 Z	Cones-4 lb.	1.49	1.44
200/16-34	B	0.6 Z	Beams	1.54	....
200/32	SD-IC	0.5 Z	Cones-4 lb.	1.58	1.53
260/16-34	B	0.6 Z	Cones-4 lb.	1.49	1.39
400/68	B	0.6 Z	Cones-4 lb.	1.39	1.29
520/32	B	0.6 Z	Cones-4 lb.	1.39	1.29

* Luster: B—Bright; SD—Semi-Dull; D—Dull; IC—Improved Color.

Pirns invoiced at 25¢ or 45¢ each, depending on type. Deposits refunded upon return of pirns in good condition. Cones are not returnable. Spools, Beams and Racks are deposit carriers and remain the property of American Enka Corporation.

Terms: Net 30 days from date of invoice. Minimum common carrier transportation charges will be prepaid and absorbed to first destination in the continental limits of the United States excluding Alaska and Hawaii. In prepaying transportation charges, seller reserves the right to select carrier used.

All prices subject to change without notice.

The Chemstrand Corp.

Current Prices Effective January 15, 1960

Denier	Filament	Twist	Type	Package	Standard Price/Lb.	Second Price/Lb.
10	1	O	SD	Bobbins	$8.42	$7.81
15	1	O	SD	Bobbins	3.89	3.69
15	1	O	SD	Spools	4.00	
15	1	O	Dull	Bobbins	3.89	3.69
15	1	O	Dull	Spools	4.00	
20	7	Z	SD	Bobbins	2.91	2.61
30	10	Z	SD	Bobbins	2.36	2.21
30	26	Z	SD	Bobbins	2.49	2.21
40	10	Z	SD	Bobbins	2.01	1.91
40	13	Z	SD	Bobbins	2.01	1.91
40	13	Z	SD	Spools	2.11	
40	13	Z	SD	Warp Wind	2.01	1.91
40	13	O	SD	Draw Wind	2.01	1.91
40	13	Z	Dull	Bobbins	2.06	1.96
40	13	Z	Dull	Spools	2.16	
40	13	O	Dull	Draw Wind	2.06	1.96
50	17	Z	SD	Bobbins	1.91	1.76
50	17	O	SD	Draw Wind	1.91	1.76
50	17	Z	Brt.	Bobbins	1.91	1.76
50	17	Z	Brt.	Warp Wind	1.91	1.76
70	20	Z	SD	Bobbins	1.71	1.66
70	34	Z	SD	Bobbins	1.71	1.66
70	34	O	SD	Draw Wind	1.71	1.66
70	34	Z	SD	Warp Wind	1.71	1.66
70	34	Z	Brt.	Bobbins	1.71	1.66
70	34	O	Brt.	Draw Wind	1.71	1.66
70	34	Z	Brt.	Warp Wind	1.71	1.66
70	34	Z	HB	Bobbins	1.76	1.66
70	34	O	HB	Draw Wind	1.76	1.66
90	26	Z	SD	Bobbins	1.76	1.66
100	26	Z	SD	Bobbins	1.65	1.60
100	34	Z	SD	Bobbins	1.65	1.60
100	34	Z	HB	Bobbins	1.70	1.60
140	68	Z	SD	Bobbins	1.60	1.55
140	68	Z	Brt.	Bobbins	1.60	1.55
200	34	Z	Brt.	Bobbins	1.49	1.44
200	34	O	Brt.	Draw Wind	1.49	1.44
200	34	Z	Brt.	Spools	1.54	
200	68	Z	SD	Bobbins	1.56	1.46
210	34	Z	HB	Bobbins	1.49	1.44
210	34	O	HB	Draw Wind	1.49	1.44
210	34	Z	HB	Warp Wind	1.49	1.44
210	34	Z	HB	Spools	1.54	....
210	34	Z	HB	Beams	1.54	
210	34	Z	RHB	Bobbins	1.59	1.44
260	17	Z	HB	Bobbins	1.49	1.39
260	17	Z	HB	Beams	1.54	
420	68	Z	HB	Bobbins	1.39	1.29
420	68	Z	RHB	Bobbins	1.49	1.29
520	34	Z	HB	Bobbins	1.39	1.29
630	102	Z	HB	Tubes	1.39	1.29
630	102	Z	HB	Beams	1.39	
720	140	Z	RHB	Tubes	1.04	1.01
720	140	Z	RHB	Beams	1.04	1.01
780	51	Z	HB	Tubes	1.39	1.29
840	140	Z	HB	Tubes	.97	.94
840	140	Z	HB	Beams	.97	.94
840	140	Z	HB	Cones	1.01	.94
840	140	Z	RHB	Tubes	.97	.94

840	140	Z	RHB	Beams	.97	.94
840	140	Z	RHB	Cones	1.01	.94
840	140	Z	HB	Paper Tubes	1.01	.94
840	140	Z	RHB	Paper Tubes	1.01	.94
840	140	Z	RHB	Textile Grade —W. W.	1.12	1.01
1040	68	Z	SD	Tubes	1.15	1.05
1040	68	Z	HB	Tubes	1.15	1.05
1050	170	Z	HB	Tubes	.97	.94
1050	170	Z	RHB	Tubes	.97	.94
1680	280	Z	HB	Tubes	.94	.91
1680	280	Z	HB	Beams	.94	.91
1680	280	Z	RHB	Tubes	.94	.91
1680	280	Z	RHB	Beams	.94	.91
1680	280	Z	RHB	Cones	.97	.94

* *Types:* D—Dull; SD—Semi-dull; B—Bright; H—High tenactiy.

Bobbins are invoiced at 25¢ or 45¢, depending on type; tubes are invoiced at 40¢ each; spools invoiced at $95.00, $110.00, and $115.00, depending on type; and beams and crates for beams are invoiced at $220.00 and $25.00 respectively.

Prices subject to changes without notice.

Freight prepaid within Continental United States and Puerto Rico.

E. I. du Pont de Nemours & Co.

Textile Fibers Dept.

Current Prices

Nylon Yarn

Denier & Filament	Turns/Inch & Twist	Type	Package	1st Grade	2nd Grade
7-1	0	200	Bobbin	$9.47	$8.82
10-1	0	200	Bobbin	8.42	7.82
12-1	0	200	Bobbin	7.35	6.85
15-1	0	200	Beam	4.00	....
15-1	0	200	Bobbin	3.89	3.69
15-1	0	680	Beam	4.00	....
15-1	0	680	Bobbin	3.89	3.69
20-1	0	200	Bobbin	4.95	4.50
14-2	0.2Z	200	Bobbin	7.90	7.30
17-2	0.2Z	200	Bobbin	7.05	6.50
20-2	0.2Z	200	Bobbin	5.55	5.05
15-3	0.2Z	200	Bobbin	6.10	5.60
21-3	0.2Z	200	Bobbin	5.48	5.05
20-7	0.5Z	200	Bobbin	2.91	2.61
20-7	0.5Z	200	Beam	3.02	....
20-7	0.5Z	680	Bobbin	2.96	2.61
20-7	0.5Z	680	Beam	3.07	....
20-20	0.7Z	209	Bobbin	6.00	....
28-4	0.2Z	200	Bobbin	2.81	2.61
30-10	0.5Z	200	Bobbin	2.36	2.21
30-10	0.5Z	200	Tricot Bms.	2.46	....
30-10	0.5Z	300	Bobbin	2.51	2.36
30-10	0.5Z	680	Bobbin	2.41	2.21
30-10	0.5Z	680	Tricot Bms.	2.51	....
30-26	0.5Z	200	Bobbin	2.49	2.21
40-1	0	100	Bobbin	4.03	3.75
40-7	0.5Z	200	Bobbin	2.11	1.91
40-10	0.5Z	200	Bobbin	2.01	1.91
40-10	0.5Z	200	Tricot Beams	2.11	....
40-13	0.5Z	200	Bobbin	2.01	1.91
40-13	0.5Z	200	Tricot Bms.	2.11	....
40-13	0.5Z	400	Bobbin	2.13	1.90
40-13	0.5Z	680	Bobbin	2.06	1.96
40-13	0.5Z	680	Tricot Bms.	2.16	....
40-34	0.5Z	200	Bobbin	2.21	1.81
50-10	0.5Z	200	Bobbins	2.11	1.76
50-17	0.5Z	100/200	Bobbin	1.91	1.76
50-17	0	200	Tubes	1.91	1.76
50-17	0.5Z	680	Bobbin	2.01	1.76
60-20	0.5Z	200	Bobbin	1.82	1.65
60-34	0.5Z	300	Bobbin	1.86	1.76
70-17	0.5Z	200	Bobbin	1.71	1.66
70-34	0	100	Tubes	1.71	1.66
70-34	0.5Z	100/200	Bobbin	1.71	1.66
70-34	0	105/205	Paper Tube	1.71	1.66
70-34	0	200	Tubes	1.71	1.66
70-34	0.5Z	280	Bobbin	1.71	1.66
70-34	0.5Z	300	Bobbin	1.76	1.66
70-34	0.5Z	680	Bobbin	1.76	1.66
70-34	0	680	Tubes	1.76	1.66
80-26	0.5Z	200	Bobbin	1.71	1.60
90-26	0.5Z	200	Bobbin	1.76	1.66
100-34	0.5Z	200	Bobbin	1.65	1.60
100-34	0.5Z	300	Bobbin	1.70	1.60
100-34	0	300	Tubes	1.70	1.60
100-34	0.5Z	680	Bobbin	1.70	1.60
100-50	0.5Z	200	Bobbin	1.71	1.60
110-50	0.5Z	200	Bobbin	1.71	1.60
140-68	0.5Z	100	Bobbins	1.60	1.55
140-68	0	200	Tubes	1.60	1.55
140-68	0.5Z	200	Bobbin	1.60	1.55
140-68	0	205	Tube	1.60	1.55
140-68	0.5Z	300	Bobbin	1.65	1.55
200-20	1Z	100	Bobbin	1.49	1.44
200-34	0	100	Tubes	1.49	1.44
200-34	0.7Z	100	Bobbin	1.49	1.44
200-34	0	105	Tube	1.49	1.44
200-34	0.7Z	680	Bobbin	1.54	1.44
200-68	0.7Z	100/200	Bobbin	1.56	1.46
210-34	0	300	Tubes	1.49	1.44
210-34	0.7Z	300	Bobbin	1.49	1.44
210-34	0.7Z	300	Beam	1.54	....
210-34	0	305	Tube	1.49	1.44
210-34	0.7Z	330	Bobbin	1.59	1.44
260-17	1Z	300	Bobbin	1.49	1.39
400-68	0.7Z	100	Bobbin	1.39	1.29
420-68	1Z	300	Bobbin	1.39	1.29
420-68	1Z	300	Beams	1.44	....
520-34	1Z	300	Bobbin	1.39	1.29
630-102	0.7Z	300	Bobbin	1.39	1.29
780-51	1Z	300	Bobbin	1.39	1.29
800-140	0.5Z	100	Bobbin	1.39	1.29
840-140	0.5Z	300/700	Al. Tbs. & Beams	.97	.94
1680-280	0.5Z	300/700	Al. Tbs. & Beams	.94	.91

Color-Sealed Yarn

Denier & Filament	Turns/Inch & Twist	Type	Package	1st Grade	2nd Grade
30-10	0.5Z	140	Bobbin	$2.71	$2.56
40-13	0.5Z	140	Bobbin	2.36	2.16
70-34	0.5Z	140	Bobbin	2.06	2.01
100-34	0.5Z	140	Bobbin	2.00	1.95
100-34	0	140	Tubes	2.00	1.95
200-20	0.7Z	140	Bobbin	1.84	1.79
200-34	0.7Z	140	Bobbin	1.84	1.79
260-17	1Z	140	Bobbin	1.84	1.79

Industrial Yarn

Denier & Filament	Turns/Inch & Twist	Type	Package	Price/Lb.
840-140	0.5Z	*707	Cone	.97
5040-840	0	*707	Paper Tube	1.01
7560-1260	0	*707	Paper Tube	1.00
10080-1680	0	*707	Paper Tube	1.00
15120-2520	0	*707	Paper Tube	1.00
2520-420	0	700	Paper Tube	.99
4200-700	0	700	Paper Tube	.98
5040-840	0	700	Paper Tube	.98
7560-1260	0	700	Paper Tube	.97
10080-1680	0	700	Paper Tube	.97
15120-2520	0	700	Paper Tube	.97

* Made specifically for cordage use.

These prices are subject to change without notice. Terms: Net 30 Days.

Types

Type 100—Bright, normal tenacity.
Type 105—Bright, normal tenacity, low shrinkage (5-7%)
Type 140—Bright, color-sealed, black, normal tenacity.
Type 200—Semidull, normal tenacity.
Type 205—Semidull, normal tenacity, low shrinkage (5-7%)
Type 209—Semidull, normal tenacity, improved light durability and dye light fastness.
Type 280—Semidull, normal tenacity, improved light durability and dye light fastness.
Type 300—Bright, high tenacity.
Type 305—Bright, high tenacity, low shrinkage (5-7%)
Type 330—Bright, high tenacity, more heat & light resistant.
Type 400—Semidull, high tenacity.
Type 680—Dull, normal tenacity.
Type 700—Bright, high tenacity.
Type 707—Bright, high tenacity cordage yarn.

Freight Terms—Terms are F.O.B. shipping point, freight prepaid our route within the continental limits of the United States, excluding Alaska.

Following are invoiced as a separate item.
Bobbins—25 cents or 45 cents depending on type
Aluminum Tube—40¢ each
Draw Winder Tubes—$.70 or $1.00 depending on type
Tire Cord Beams—$220.00 each
Cradles for Tire Cord Beams—$115.00 each
Tricot Beams—$95.00 each
Cradles for Tricot Beams—$130.00 each
(Beams and Cradles are deposit carriers and remain the property of E. I. du Pont de Nemours & Co., Inc.)

POLYESTER

E. I. du Pont de Nemours & Co.

Textile Fibers Dept.

Current Prices

"Dacron"*

Denier & Filament	Turns/Inch	Luster	Type*	Tubes 1st Gr.
30-14	0	Bright	55	$2.71
30-20	0	Semidull	56	2.71
40-27	0	Semidull	56	2.31
40-27	0	Bright	55	2.31
40-27	0	Dull	57	2.36
70-34	0	Semidull	56	1.91
70-14	0	Bright	55	1.91
70-34	0	Bright	55	1.91
70-34	0	Dull	57	1.96
100-34	0	Semidull	56	1.84
140-28	0	Bright	55	1.79
150-34	0	Semidull	56	1.79
220-50	0	Bright	51	1.76
250-50	0	Bright	55	1.76
1100-250	0	Bright	51	1.50
1100-250	0	Bright	52	1.50

Terms: Net 30 days.

Domestic Freight Terms are F.O.B. shipping point, freight prepaid our route within the Continental limits of the U. S., excluding Alaska.

Yarn Types

* Type:
Type 51—Bright, high tenacity.
Type 52—Bright, high tenacity.
Type 55—Bright, normal tenacity.
Type 56—Semidull, normal tenacity.
Type 57—Dull, normal tenacity.

Tubes are invoiced as a separate item at $.70 each.

* "DACRON" is DuPont's registered trade-mark for its polyester fiber.

SARAN

The National Plastics Products Company—Fibers Division
Odenton, Maryland

Current Prices:

CONTINUOUS FILAMENT

Type	Twist p. i.	Natural	Colors
1240/10	3	$1.32	$1.37
750/20*	3	1.75	1.80

* For filter fabrics and other industrial purposes only.

F.O.B. Odenton, Maryland.

Terms: Net 30 days.

NON CELLULOSIC STAPLE & TOW ACRYLIC

American Cyanamid Co.
Fibers Division

Effective Date: November 24, 1959

Cyanamid Acrylic Staple

	1st Grade Price (per pound)
2.0 Denier Bright and Semi-Dull	$1.28
3.0 Denier Bright and Semi-Dull	1.18
5.0 Denier Bright and Semi-Dull	1.18
15.0 Denier Bright, Semi-Dull and Dull	.93

Staple Lengths: 1½", 2" 2½", 3", 3½", 4", 4½".

Information provided on request for Deniers, Lengths and Lusters not listed above.

Prices are subject to change without notice.

Terms: Net 30 Days.

F.O.B. Shipping Point—Minimum transportation allowed (Seller's route and method) within the continental limits of the United States excluding Alaska. If Buyer requests and Seller agrees to a route or method involving higher than minimum rate, Buyer shall pay the excess transportation cost.

Note: CRESLAN® is Cyanamid's registered trademark for certain of its acrylic fibers. Use of this trademark is authorized only on properly constructed fabrics, after they have been tested and approved by Cyanamid.

The Chemstrand Corp.

Current Prices

"Acrilan"*

Effective January 1, 1959

	Acrilan	Acrilan 16
2.0 denier Semi-Dull and Bright staple & tow	$1.18	$1.18
2.5 denier Hi-Bulk Bright and Semi-dull staple and tow	1.18	1.18
3.0 denier Bright & Semi-dull staple & tow	1.18	1.18
5.0 denier Bright & Semi-dull staple & tow	1.18	1.18
8.0 denier Bright & Semi-dull staple	1.18	1.18
15.0 denier Bright & Semi-dull staple	.93	.97

Terms: Net 30 days. Freight prepaid within Continental U. S. & Puerto Rico.

* "Acrilan" is Chemstrand's registered trademark for its acrylic fiber.

The Dow Chemical Company

Textile Fibers Department

Current Prices

"Zefran"*

2.0 denier Semidull & Bright—Staple only	$1.28
3.0 denier Semidull & Bright—Staple only	1.28
6.0 denier Semidull & Bright—Staple only	1.18

Terms: Net 30 days.

Transportation Terms: F.O.B. shipping point—Freight prepaid our route within the continental limits of the U. S., excluding Alaska.

* "Zefran is Dow's registered trademark for its acrylic fiber.

E. I. du Pont de Nemours & Co.

Textile Fibers Dept.

Current Prices

"Orlon"** Acrylic Staple & Tow

Type 42	Staple Length	Tow Bldg.	1st Grade
1.0 Denier Semidull	1¼, 1½, 2, 2½, 3	420M	$1.28
2.0 Denier Semidull & Bright	1¼, 1½, 2, 2½, 3, 4½	470M	1.28
3.0 Denier Semidull & Bright	1¼, 1½, 2, 2½, 3, 4½	470M	1.28
3.0 Denier Color-sealed Black	1¼, 1½, 2, 2½, 3, 4½	470M	1.63
6.0 Denier Semidull & Bright	1½, 2, 2½, 3, 4½	470M	1.18
6.0 Denier Color-sealed Black	1½, 2, 2½, 3, 4½	470M	1.55
4.5 Denier Semidull	1½, 2, 2½, 3, 4½	470M	1.18
10.0 Denier Semidull & Bright	1½, 2, 2½, 3, 4½	470M	1.18

Tow—Total Denier 470,000

Staple Lengths—1½", 2", 2½", 3", 4½"

High Shrinkage Staple price as Regular Staple

Type 25 $1.18

This product is designed for *Cotton/Rayon System* Spinning and is 2.5 denier, 1½" semidull regular shrinkage staple.

Type 38—4.1 Denier—Semidull—592M Tow $1.18

This product can be dyed, stretched and cut to produce staple which will shrink as much as 38% when subjected to heat.

Type 39 $.94

This product is designed for *woolen system spinning* and is a blend of deniers (average 4.2) with a variable cut length.

Type 39A $.99

This product is designed for *woolen system spinning* and is a blend of predominately fine deniers (average 2.4) with a variable cut length.

Type 39B $.94

This product is designed for *woolen system spinning* and is a blend of predominately heavy deniers (average 6.5) with a variable cut length.

F.O.B. Shipping Point—Freight prepaid our route within the continental limits of the United States, excluding Alaska.

MODACRYLIC

Eastman Chemical Products, Inc.
Tennessee Eastman Co.

Effective November 3, 1958

"Verel"* Staple and Tow

Deniers	Dull and Bright
2 and 3	$1.02 per pound
5, 8, and 12	.92
16 and 20	.88
24 denier	.93

Prices are subject to change without notice.

Terms: Net 30 days. Payment—U. S. A. dollars.

Transportation charges prepaid or allowed to destination in continental United States, except Alaska. Seller reserves right to select route and method of shipment. If Buyer requests and Seller agrees to a route or method involving higher than lowest rate Buyer shall pay the excess of transportation cost and tax.

* "Verel" is a trade-mark of the Eastman Kodak Co.

Union Carbide Chemicals Co.

Div. Union Carbide Corp.

Textile Fibers Dept.

Effective October 1, 1957

Dynel Staple & Tow

Natural Dynel	
3, 6, and 12 Denier, Staple and Tow	1.10 per lb.
24 Denier, Staple and Tow	1.05 per lb.
Dynel Spun with Light Colors:	
Blond, Pewter, or Gray	
3 and 6 Denier, Staple and Tow	1.30 per lb.
Dynel Spun with Dark Colors:	
Black, Charcoal, Brown, Caramel, Green, and Blue	
3 and 6 Denier, Staple and Tow	1.40 per lb.
Dynel Type 63 High Shrinkage (3 Denier only)	Add $.05 per lb. to above prices

Prices are quoted f.o.b. South Charleston, W. Va.

NYLON

E. I. du Pont de Nemours & Co.

Textile Fibers Dept.

Current Prices

Nylon Staple and Tow

Denier	Type	Staple Lengths	Tow Bundle	1st. Grade Price/Lb.	2nd Grade Staple Only
1.5	200	1½"—4½"	None made	$1.33	$1.18
1.5	201	1½"—4½"	None made	1.35	1.20
2.3	420	1½" only	None made	1.28	1.13
3.0	100/200	1½"—4½"	430M	1.28	1.13
3.0	101/201	1½"—4½"	455M	1.30	1.15
6.0	100	1½"—6½"	330M	1.28	1.13
6.0	101	1½"—6½"	345M	1.30	1.15
15.0	100	1½"—6½"	425M	1.08	....
15.0	101	1½"—6½"	None made	1.10	....
15.0	600	1½"—6½"	425M	1.10	....
15.0	601	1½"—6½"	None made	1.12	....

Staple lengths are restricted to the range shown opposite each denier above. The actual cut lengths within these ranges are as follows:

1½, 1½, 2, 2½, 3, 4½ and 6½

Types

Type 100 Bright, normal tenacity, not heatset.
Type 101 Bright, normal tenacity, heatset.
Type 200 Semidull, normal tenacity, not heatset.
Type 201 Semidull, normal tenacity, heatset
Type 420 Semidull, high tenacity, high modulus, no crimp.
Type 600 Dull normal tenacity, not heatset.
Type 601 Dull normal tenacity, heatset.

These prices are subject to changes without notice.

Terms—Net 30 Days.

Freight Terms—Terms are F.O.B. shipping point, freight prepaid our route within the continental limits of the United States, excluding Alaska.

Industrial Rayon Corp.

Effective August 18, 1958

Nylon Staple

1.5 denier	$1.33 per lb.
2, 3 and 6 denier	1.28 per lb.
8 denier	1.15 per lb.
15 and 22 denier	1.08 per lb.

Bright, semi-dull, and full-dull. Required lengths.

NYTRIL

B. F. Goodrich Chemical Co.
A division of The B. F. Goodrich Co.

DARVAN

Effective Nov. 21, 1958

Type	Price Per Pound Not Crimp Set	Crimp Set
3, 4½ and 6 Denier	$1.45	$1.50
1½, 2 Denier	$1.50	$1.55

Pack in 100 Lb. Bales, Net
Staple lengths 1½, 2, 3, 4½
Tow—90,000 Total Denier
Bright, Semi-dull, Dull

(Deniers and lengths of staple not listed above are available upon special request.)

Terms: Net 30 Days.

F.O.B. Shipping Point (Avon Lake, Ohio) Minimum freight prepaid our route to points east of the Mississippi River within the continental limits of the United States, for points west of the Mississippi River freight allowed to the Mississippi River crossing nearest purchaser's mill if overland, or port of exit of purchaser's choice east of the Mississippi River.

POLYESTER

Beaunit Mills Inc.

Vycron Polyester

Effective: November 20, 1959

		Denier		Price Per Lb.
Staple		1.5		$1.36
		3.0		1.36
Staple Cuts are 1½", 2", 3", and 4".				
Tow for Converters		1.5		1.36
(Tow Bundle 200,000 Denier)		3.0		1.36
	1 Den.	1.5 Den.	3 Den.	
Tow Yarn for Direct Spinners		420/280	420/140	1.65
and Coarse Denier Yarns		840/560	840/280	1.60
	1120/1120			1.49
No Twist Tubes		1260/840	1260/420	1.36
		1680/1120	1680/560	1.36
	2240/2240			1.45
		3360/2240	3360/1120	1.36

Holt Firm to Continue

Holt Associates, Inc., has been formed in Greensboro, N. C., as the successor corporation to R. E. L. Holt, Jr., and Associates, Inc., textile specialties selling house. Officers of the new firm are: James G. Skinner, president; David R. Sellars, executive vice president, and Mrs. R. E. L. Holt, Jr., and John P. Norman, vice presidents.

Holt Associates will continue to maintain offices in Greensboro, N. C.; Greenville, S. C.; and West Point, Ga. The new firm will continue also to sell the same lines of mill equipment and other items as its predecessor. Among these lines, it was announced, are the products of Mitchell-Bissell Co., Trenton, N. J., manufacturers of thread guides and related products.

Spunize Process Facts

Spunize Co. of America, Inc., reports it now owns all U. S. and North America Spunize patents and rights, and that it is the sole licensor under Patent Numbers 2,715,309 and 2,860,400 and a number of additional pending applications. Spunize reports that it is continuously engaged in research in connection with crimped continuous filament yarns and three-dimensional bulking of fibers, and assists in coordinating new developments and quality control for its licensees. Corresponding world wide patents and applications are owned by its affiliated company, Textura, A.G., in Switzerland.

Thus far only Bibb Manufacturing Co. is commercially producing Spunized yarn for carpet use. Du Pont, in the U. S. and Canada, operating under limited license, is mainly interested in achieving extreme high bulk in nylon and Dacron staple fiber. Other licensees are currently developing crimped continuous filament yarns for bulky sweaters, upholstery yarns, industrial use, and other carpet uses. All are expected to be in full commercial production by mid-1960.

Sizes as fine as 30 and 40 denier are currently being studied on an experimental basis for tricot and similar use. The Spunize process permits bulk of the finished yarn to be increased or diminished with good degree of uniformity. Yarns made on the Spunize process also lend themselves readily to skein or package dyeing. *For further information write the editors.*

Cold-Weather Test

Chemstrand Corp. sponsored a field expedition 500 miles north of Montreal, Canada, in mid-January to test insulating and wear properties of products made of the company's Acrilan acrylic fiber and nylon. The testing site was expected to encounter temperatures ranging as low as 30 to 50 degrees below zero Fahrenheit. Shelters consisted of special tents of nylon but, to achieve ultimate conditions, the test personnel also spent time in sleeping bags completely exposed to the elements.

In addition to specifically establishing the performance of Acrilan and Chemstrand nylon, comparative products and procedures will subject other manmade and natural fibers to identical circumstances and testing procedures.

Bondex 'Pocket' Line

The Bondex line of hot iron tapes for mending and decorating has been expanded to include a pocket replacement, according to Coats & Clark, Inc., distributors. Each replacement measures 4¾ by 6½ inches and is packaged in a polyethylene bag. The item retails for 29 cents each. *For further information write the editors.*

Terms: Net 30 days, F.O.B. shipping point. Minimum freight allowed to consignee's nearest freight station east of the Mississippi River. To points west of the Mississippi River minimum freight to Memphis, Tenn. allowed. Goods after shipment shall be at buyer's risk. Merchandise transported in seller's own trucks or those of its affiliates is sold F.O.B. delivery point. Prices subject to change without further notice.

E. I. du Pont de Nemours & Co.

Textile Fibers Dept.

Current Prices

"Dacron"* Staple and Tow

Denier	Luster	Type*	Length	Tow Bundle	1st Gr.
1.25	Semidull	54	1¼"-3"	None made	$1.36
1.5	Semidull	64	Tow only	550M	1.41
1.5	Semidull	54	1¼"-3" & Tow	550M	1.36
3.0	Semidull	64	1¼"-4½" & Tow	450M	1.41
3.0	Semidull	54	1¼"-4½" & Tow	450M	1.36
3.0	Semidull	61	1¼"-4½"	None made	1.36
4.5	Semidull	64	1¼"-4½" & Tow	450M	1.36
4.5	Semidull	54	1¼"-4½" & Tow	450M	1.31
6.0	Semidull	64	1¼"-4½" & Tow	450M	1.36
6.0	Semidull	54	1¼"-4½" & Tow	450M	1.31
6.0	Semidull	61	1¼"-4½"	None made	1.31

* Type:
Type 54—Semidull, Normal Tenacity.
Type 61—Industrial Staple having 45% Shrinkage. Not intended for Dyeable Uses.
Type 64—More Pill Resistant Staple, with Greater Dyeing Versatility.

F. O. B. Shipping Point—Freight prepaid our route within the continental limits of the United States, excluding Alaska.

Eastman Chemical Products, Inc.

Tennessee Eastman Co. Effective September 15, 1958

"Kodel"*

Deniers	Semi-Dull	Black
1½, 3, and 4½	$1.44	$1.79
2.25		1.79

Terms: Net 30 days. Payment—U. S. A. dollars.
Transportation charges prepaid or allowed to destination in continental United States, except Alaska. Seller reserves right to select route and method of shipment. If Buyer requests and Seller agrees to a route or method involving higher than lowest rate Buyer shall pay the excess of transportation cost and tax.
* "Kodel" is a trade-mark of the Eastman Kodak Company.

VINYON

American Viscose Corp. Effective October 1, 1956

Avisco Vinyon Staple

3.0 denier	½" unopened	$.80 per lb.
3.0 "	1¼" unopened	.80 per lb.
3.0 "	1¼" opened	.90 per lb.
3.0 "	2" opened	.90 per lb.
3.0 "	2" unopened	.80 per lb.
5.5 "	1" opened	.90 per lb.
5.5 "	3½" opened	.90 per lb.
5.5 "	3½" unopened	.80 per lb.

Terms: Net 30 days.

SARAN

The National Plastics Products Company—Fibers Division
Odenton, Maryland

Current Prices: Saran Staple

Type	Denier	Natural	Colors
2N—Upholstery	22	$0.70	$0.75
2N—Upholstery	16	.74	.79
3Q—Industrial Fabrics	22	.68	.72
1C—Carpets	22	.68	.72
1M—Mops	22	.68	.72

In any staple length 1½ to 6". Also 45 denier, 7" cut.
F.O.B. Odenton, Maryland.
Terms: net 30 days.

Business Service Section

Exclusively for Business, Laboratory and Mill Services; Positions and Men Wanted; Business Opportunities; Mill Properties Wanted or For Sale; Reconditioned Machinery and Equipment, etc.

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2 columns to the page, each column 8 inches deep

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7	Inches	49.00
8	Inches	52.00

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Yarn sales organization with coverage of sweater, fabric knitters and weavers. Interested in representing reputable mill in Metropolitan New York, Pennsylvania, North Carolina and South Carolina area. 100% wool blends, etc.

Box 839,
Modern Textiles Magazine
303 5th Ave., NYC

Calendar of Coming Events

Mar. 1-4—ASTM Committee D-13 spring meeting. Sheraton-Atlantic Hotel (formerly Sherton-McAlpin) New York, N. Y.
Mar. 2—AATT monthly meeting. Della Robbia Room, Hotel Vanderbilt, New York, N. Y.
Mar. 10-11—Fiber Society spring meeting. Roosevelt Hotel, New Orleans, La.
Mar. 17-18—Southern Textile Methods & Standards Association, spring meeting. Clemson House, Clemson, S. C.
Mar. 24-25—Textile Quality Control Association, spring technical meeting. Dinkler Plaza Hotel, Atlanta, Ga.
Mar. 24-25—Textile Research Institute annual meeting. Hotel Commodore, New York, N. Y.
Mar. 31-Apr. 1—ASME Textile Engineering Conference. N. C. State College, Raleigh, N. C.
Apr. 6—AATT monthly meeting. Della Robbia Room, Hotel Vanderbilt, New York, N. Y.
Apr. 7-9—American Cotton Manufacturers Institute annual convention. American Hotel, Bal Harbor, Fla.
Apr. 20-22—Alabama Textile Manufacturers Association, annual meeting. Buena Vista Hotel, Biloxi, Miss.
Apr. 21-24—National Association of Hosiery Manufacturers annual meeting. Americana Hotel, Miami Beach, Fla.
Apr. 22—Textile Institute, annual general meeting. Midland Hotel, Manchester, England.
Apr. 26—Institute of Textile Technology, Charlotteville, Va. Meetings of Technical Advisory Committee and Board of Trustees.
Apr. 28-30—Phi Psi National Textile Fraternity 57th annual convention. Hotel Roosevelt, New York, N. Y.
Apr. 29—Underwear Institute annual meeting. Hotel Biltmore, New York, N. Y.
May 4—AATT monthly meeting. Della Robbia Room, Hotel Vanderbilt, New York, N. Y.
May 11-14—Carolina Yarn Association. The Carolina, Pinehurst, N. C.
May 19-21—Georgia Textile Manufacturers Association, anniversary meeting. Diplomat Hotel and Country Club, Hollywood, Fla.
May 23-27—American Textile Machinery Exhibition. Auditorium, Atlantic City, N. J.
May 25-27—Narrow Fabrics Institute, Inc. spring meeting. Atlantic City Country Club, Northfield, N. J.
May 25-28—Tufted Textile Manufacturers Association annual convention. Fontainebleau Hotel, Miami Beach, Fla.
May 26-28—S. C. Textile Manufacturers' Association annual meeting. The Cloister, Sea Island, Ga.
May 31-Jun. 2—Cotton Research Clinic. Grove Park Inn, Asheville, N. C.
Jun. 1—AATT monthly meeting. Della Robbia Room, Hotel Vanderbilt, New York, N. Y.
Jun. 23-25—Southern Textile Association annual convention. Grove Park Inn, Asheville, N. C.
Jun. 26-Jul. 1—ASTM annual meeting. Chalfonte-Haddon Hall, Atlantic City, N. J.
Sep. 7-8—Combed Yarn Spinners Association annual meeting. Greenbrier, White Sulphur Springs, W. Va.
Sep. 27-28—Chemical Finishing Conference, sponsored by National Cotton Council. Statler Hotel, Washington, D. C.
Oct. 3-7—Southern Textile Exposition. Textile Hall, Greenville, S. C.
Oct. 6-8—AATCC national convention. Sheraton Hotel, Philadelphia, Pa.

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SYNTHETIC FIBER LUBRICANTS

Nopcostat® Series	AS-40, LV-40, 2152-P, 2152-X. A family of highly antistatic lubricants for application to synthetic fibers and their blends. The Nopcostat Series provides the user with a range of fiber-to-metal and fiber-to-fiber frictional characteristics
Nopcotex® A	Non-soiling fiber lubricant recommended for processing natural and synthetic carpet staple
Nopcotex B	Processing aid for Corvel staple; antigraphite lubricant for lace yarns

CONING OILS

Konrite® A	All-purpose antistatic coning oil. Medium viscosity with built-in detergency
Nopcone® AR	Low-viscosity antistatic lubricant specially designed for bulk yarns and low denier synthetic filament yarns
Nopcone LV	Extra-low-viscosity lubricant designed for bulk and stretch yarns, polyamide, polyester and polyacrylic filament yarns

WARP SIZING PRODUCTS

Nopcosize® N	Modified polyacrylic acid for sizing of filament nylon
Nopcosize D	Water-soluble polymeric size developed for slashing Dacron* filament yarns
Nopco 1111	Plasticizer and lubricant for rayon and acetate sizes. Also used extensively in the soaking of rayon crepe yarns
Nopco 1440	Warp size bath additive that acts as a plasticizer, lubricant and penetrant for rayon and acetate sizes
Nopcolube® 55	Lubricant added to polyacrylic acid size bath for Nylon to eliminate topwaxing

*Trademark of E. I. du Pont de Nemours & Co., Inc.

WOOL AND WORSTED OILS

Nopco FUA®	Self-scouring all fatty wool oil
Nopcostat 56-C	Antistatic oil recommended for use on all woolens. Applied in range of 3-5% owf
Nopco 100	Blended fatty lubricant for wool and synthetic fibers
Worsted Oil 12®	Outstanding antistatic worsted lubricant. Provides optimum fiber-to-metal frictional characteristics and interfiber cohesion

DETERGENTS

Hyonic® PE	Series of polyoxyethylene condensates offering a range of oil and water solubility with numerous applications in the textile industry
Syntergent® 28-B	Nonionic raw wool scouring detergent
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Nopco 1658-C	An inexpensive detergent designed to replace soap for fulling and scouring on a pound-for-pound basis
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DYEING AND FINISHING

Nopcotex	Trademark for Nopco's line of softeners. Products available for all phases of fabric finishing
Polymul® Series	Series of polyethylene emulsions used as pure finishes and softeners in resin formulations
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NOPCO®

NOPCO CHEMICAL COMPANY

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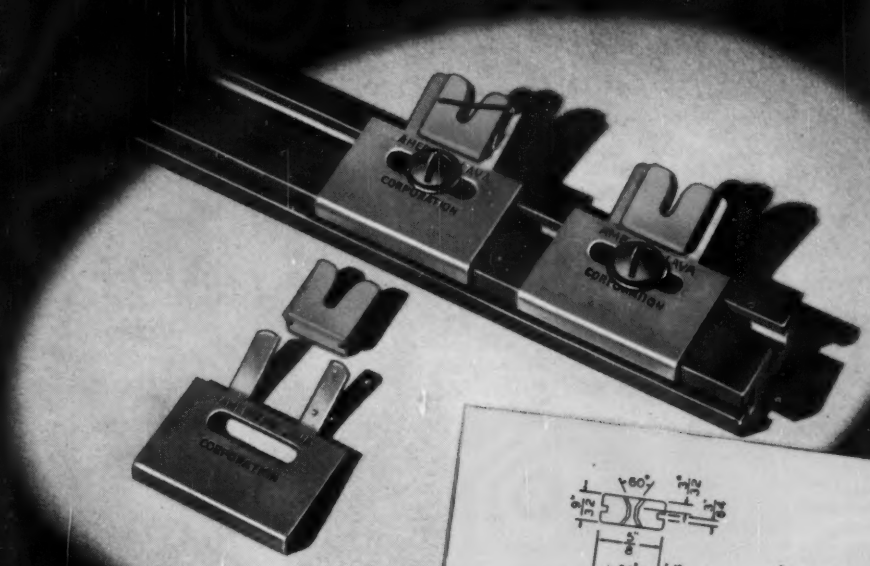
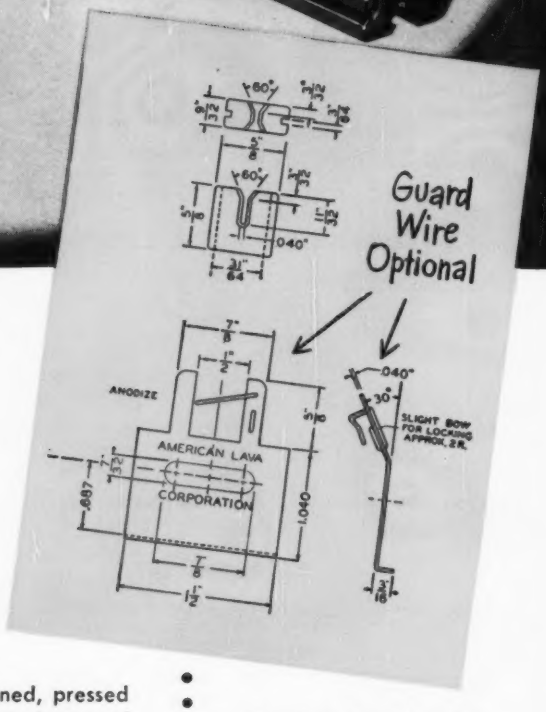
ANODIZED ALUMINUM HOLDERS

Part No. 20201-G (no guard wire)

Part No. 20201-H (with guard wire to keep the yarn from jumping out.)

Above holders fit the metal rail of ATWOOD MODEL 110 UP-TWISTER. Other holders are available to fit the rails of other makes of winders, spinners, redraws and up-twisters.





ALSIMAG® WINDER, SPINNER, REDRAW AND UP-TWISTER GUIDES

FEATURE:

LONG LIFE: AlSiMag guides are hard, homogeneous. According to records from many mills, these guides will give you at least 10 times the service of any other make of guide.

FEWER BROKEN FILAMENTS: No surface "skin" to wear through. Wear is very gradual, simply reveals new surfaces of the same character as the original. No sharp edges to cause undetected yarn damage.

EASY TO INSTALL: These anodized aluminum holders with Screw slots that permit adjustment are available to fit the bars of several makes of machines.

EASY, QUICK CLEANING: Guides are lifted out of holders, cleaned, pressed back in position. Slight bow in top of holder holds guide firmly in position.

LESS DOWN TIME: Quickly, permanently installed. Guides lift out for fast cleaning.

MORE UNIFORM TENSION: AlSiMag guides are uniform physically and dimensionally. Available in High Polish or Satin finish. BETTER PACKAGE UNIFORMITY is the obvious result.

LOWEST COST per pound of yarn processed. Mill records indicate that this guide will do a better job for you and at LESS THAN 10% OF YOUR FORMER GUIDE COST.

The dimensional drawing above shows construction. Note oblong screw slot for easy adjustment and positioning. Slight bow in top area of holder permits guide to be quickly removed, cleaned and replaced.

TEST SAMPLES ON REQUEST

Our statements about these guides sound pretty enthusiastic but your own tests will prove that they are conservative. Test samples without charge. Tell us what machine you'll use them on so we can be sure to send you the right holders to fit it.

58TH YEAR OF CERAMIC LEADERSHIP

AMERICAN LAVA CORPORATION

A SUBSIDIARY OF MINNESOTA MINING AND MANUFACTURING COMPANY

CHATTANOOGA 5, TENNESSEE

SALES ENGINEERS: NEW ENGLAND: W. J. Geary, 27 Fairlawn St., Cranston, R. I., Williams 1-4177. NORTHEAST: J. S. Gosnell, 205 Walnut St., Livingston, N. J., WYman 2-1260, SOUTHEAST: James W. Crisp, Route 4, Taylors, South Carolina, CHurchill 4-0063. ALL OTHER AREAS: J. B. Shacklett, W. M. Crittenden, Jr., or W. H. Cooper, American Lava Corporation, Chattanooga 5, Tenn., AMherst 5-3411. REPRESENTATIVES: CANADA: Ian M. Haldane & Co., P. O. Box 54, London, Ont. ALL OTHER COUNTRIES: Minnesota Mining & Mfg. Co., International Div., 99 Park Avenue, New York, N. Y.